M.P. No. 458

6500

SHEPARD ELECTRIC CRANE AND HOIST COMPANY

BULLETINS

ELECTRIC CRANES

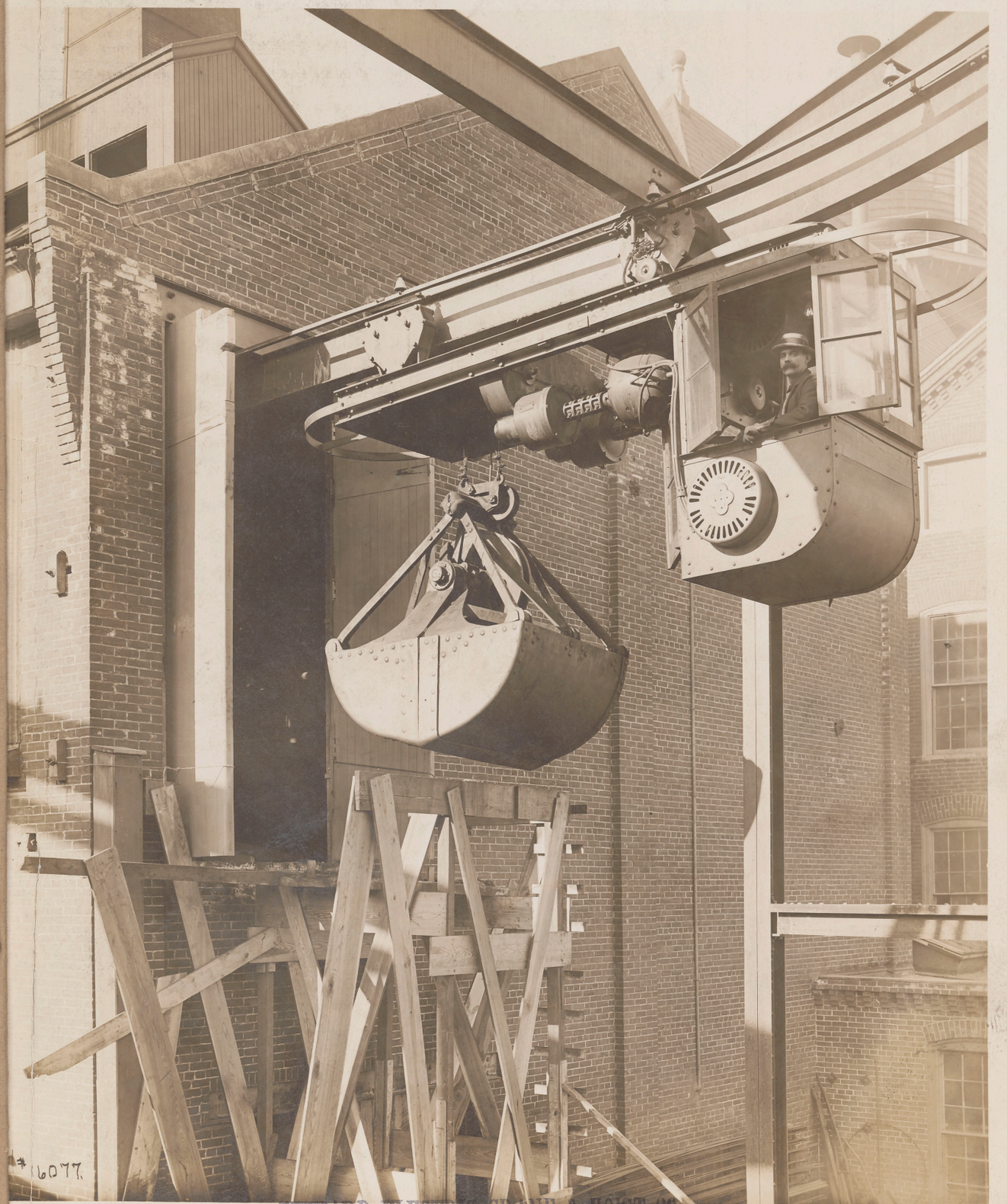
ELECTRIC HOISTS

PNEUMATIC HOISTS

COMPRESSION RIVETERS

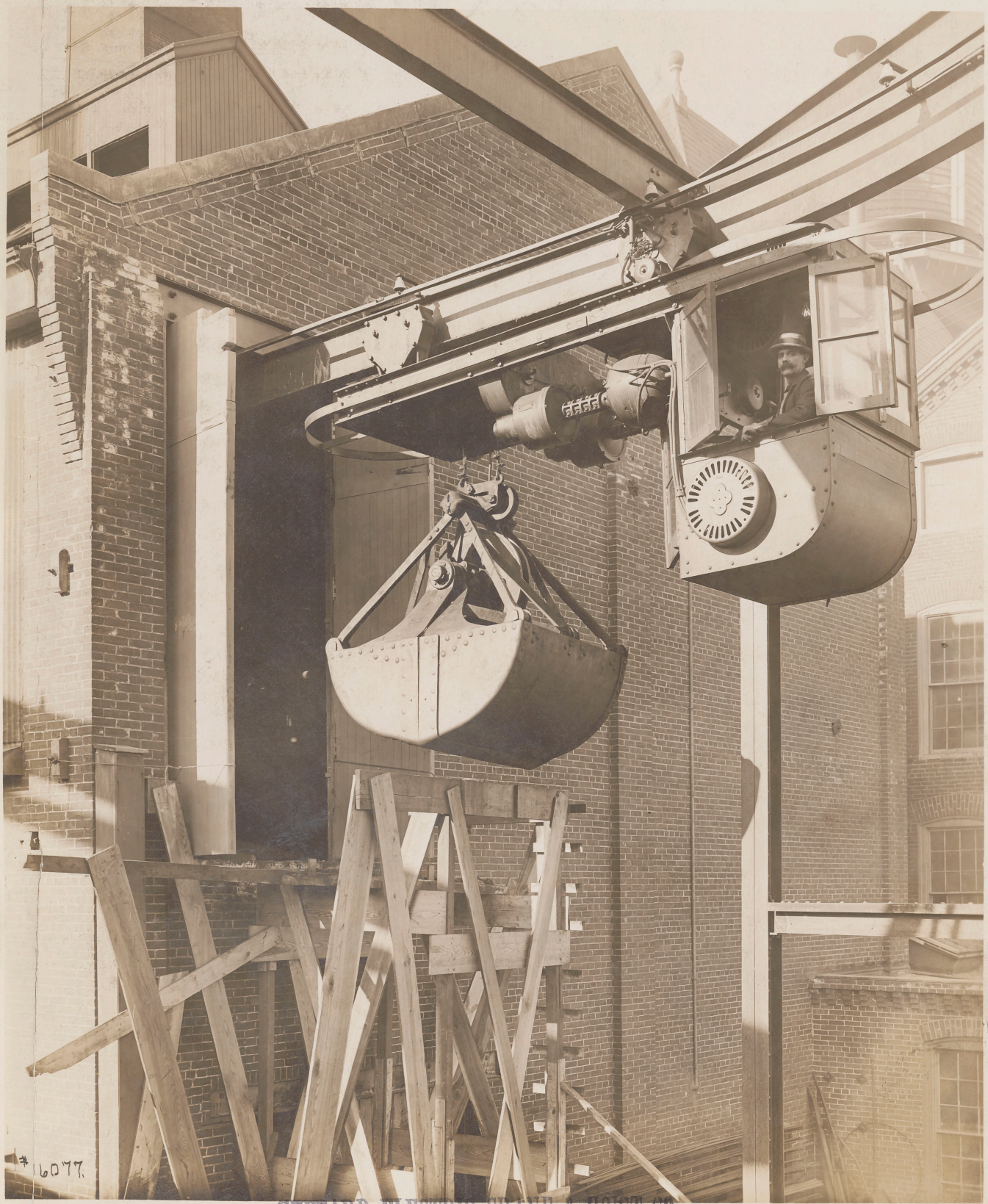
TROLLEYS

APR 28 1911
OFFICE OF
MASTER MECHANIC
CHAMBERSBURG PA



#6077.

SHEPARD ELECTRIC CRANE & HOIST CO.
STEPHEN GIRARD BLDG.
PHILADELPHIA, PA.



#1077.

SHEPARD ELECTRIC CRANE & HOIST CO.
STEPHEN GIRARD BLDG.
PHILADELPHIA, PA.

FULTON BLDG.
NEW YORK

PEOPLES GAS BLDG.
CHICAGO

SHEPARD ELECTRIC CRANE & HOIST COMPANY

MONTOUR FALLS, N.Y.

MACHESNEY BLDG.
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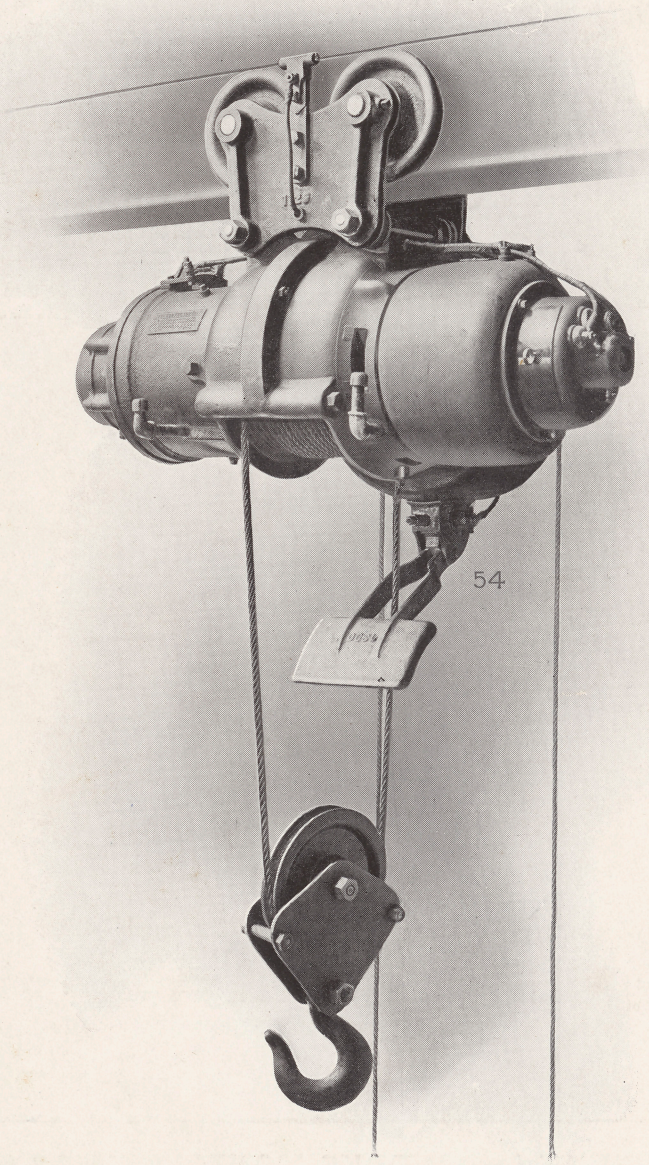
STEPHEN GIRARD BLDG.
PHILADELPHIA

BULLETIN No. 503

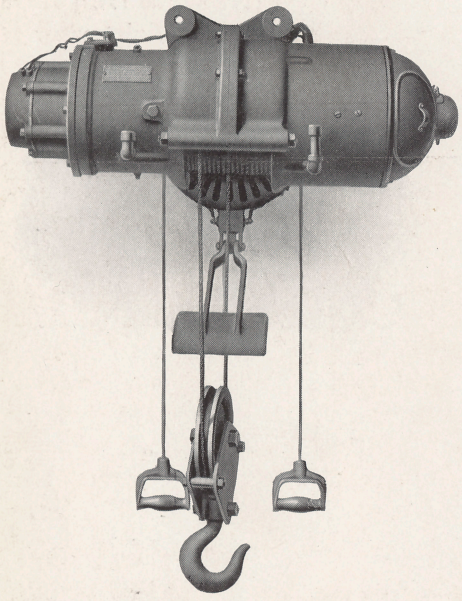
ELECTRIC HOIST TYPES



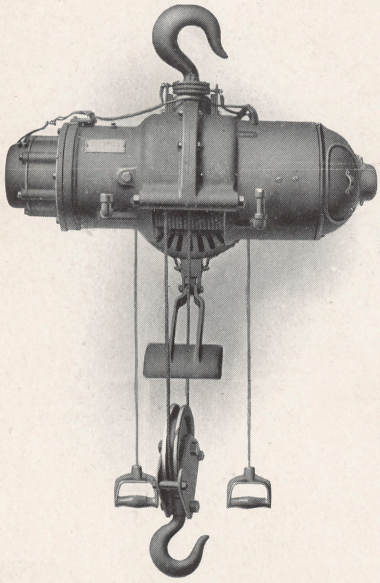
SINGLE I-BEAM ELECTRIC TRAVELING HOIST

SHEPARD ELECTRIC CRANE & HOIST COMPANY

DETAILS OF CONSTRUCTION OF SHEPARD ELECTRIC HOISTS



Two-Part Hoist without trolley is furnished up to 12½ tons capacity. It is especially adapted to old hand cranes as it can be readily fitted to an installed trolley.



Hook Type Hoist is furnished in a number of sizes and capacities. It is especially adapted for use on Jib Cranes or wherever transferring is desired.

The Hoist Frame consists of two castings joined together by through bolts. The outer ends are closed by bonnets, one enclosing the motor and the other the gearing and brakes which are thus completely sealed and arranged to be flooded with oil. The moving parts are thus given the most favorable operating conditions and are protected from injury and prevented from causing injury.

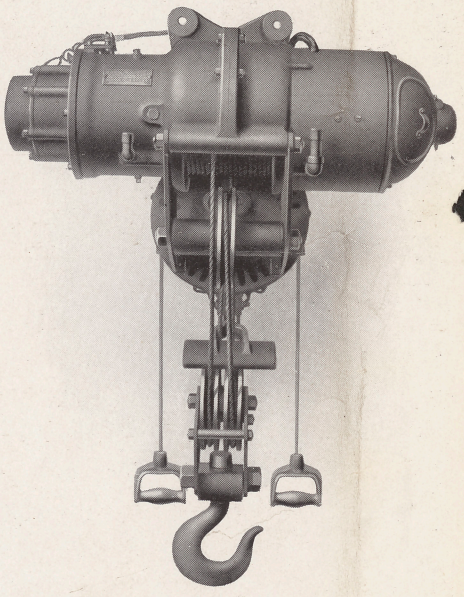
The Motor is a series-wound slow-speed crane motor.

The Foundry Controller affords the most delicate speed control possible. Thirteen to seventeen running speeds are obtained at evenly spaced intervals of the movement of the controller handle. It is arranged to center automatically bringing the load hook to rest when released. The controller is provided with a magnetic blow-out. The contacts and brushes may be removed and replaced without disturbing other parts or any connections. The operating parts are fully enclosed from dust and are moisture-proof.

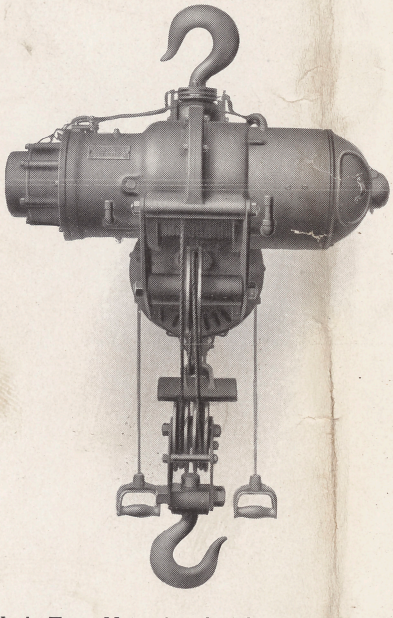
The entire mechanism may be removed from its case without disconnecting a single wire. Damage and delay incident to transposing connecting wires are therefore avoided.

Hoist Gearing, "The Balanced Drive." The hoist gearing consists of a double train of machine-cut spur gears having either two or three-speed reductions.

All gears drive at two points diametrically opposite, thus dividing the work among double the number of gear teeth which would be in contact by the usual arrangement. The stresses are, therefore, perfectly balanced and there is no pressure imposed upon the shaft bearings.

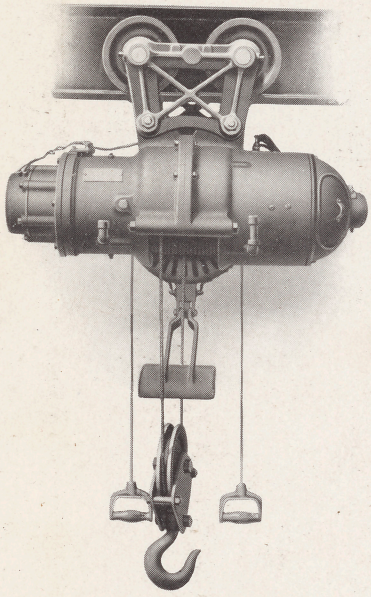


Four-Part Hoist without trolley is furnished up to 20 tons capacity. It is recommended for short lifts at comparatively slow speeds.

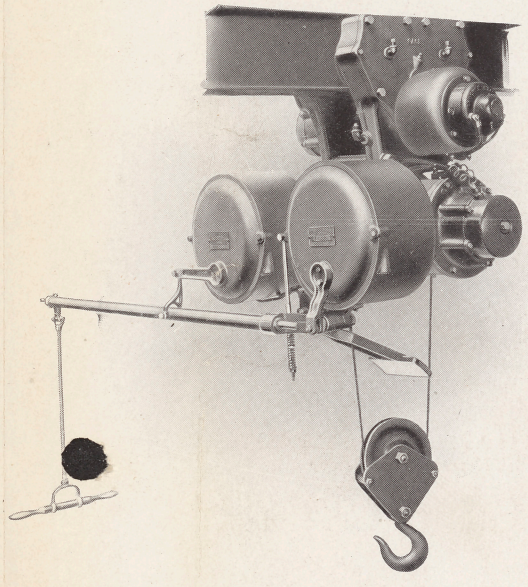


Hook Type Hoist for slow heavy work. It is admirably adapted for use on derricks used in loading or unloading.

SHEPARD ELECTRIC CRANE & HOIST COMPANY



Single I-Beam Hoist for quick, accurate work. Furnished for serving machine tools or any foundry work.



Two-Motor Outrig Controlled Hoist is adapted for use in handling ladles or wherever heat or fumes make it necessary for operator to be a short distance from load.

This permits gears to be made extremely heavy in proportion to the loads, while at the same time the gear train is sufficiently compact to be placed within a single enclosure. Since the gears are in a double train, breakage at two points simultaneously would be necessary before the load would fall.

The Balanced Drive naturally gives a very high efficiency; when enclosed and running in oil its efficiency, durability and reliability are not even approximated by any other construction.

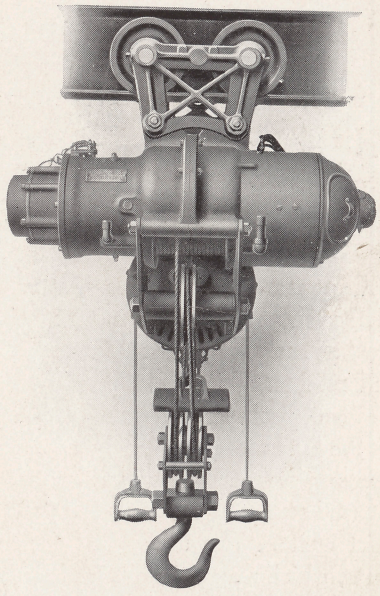
The entire gear train is of forged or cast steel.

A Mechanical Brake automatically holds the load when the motor is at rest, and prevents excessive speed in lowering. It interposes no resistance in hoisting and in lowering only sufficient to control the load; it is released by revolving the motor in the lowering direction and will set whenever the load tends to descend at a speed slightly greater than that corresponding to the speed of the motor.

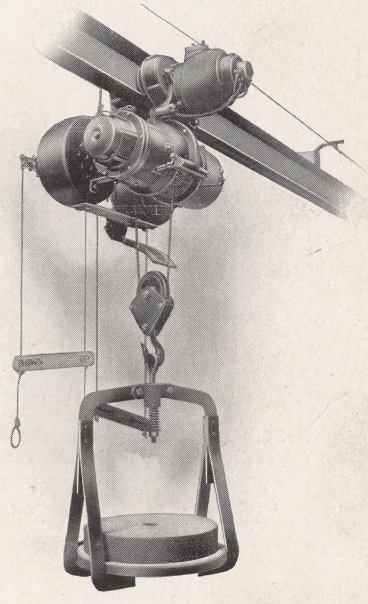
The mechanical brake is contained in the same enclosure as the gearing and runs in oil, which, in addition to lubricating the brake surfaces conducts away any heat generated.

An Electric Brake applied directly to the motor shaft is provided for all hoists having Foundry Control, it serves to bring the motor promptly to rest when the current is cut off or is accidentally interrupted; it is connected in series with the motor and is always set unless held off by current flowing through its windings to the motor.

Its friction surfaces run in oil.



Single I-Beam Hoist for slow, accurate work Admirably suited for heavy work in a small plant as it will perform most of the work of a traveling crane and costs much less.



Two-Motor Floor Controlled Hoist is also furnished for remote control and is adapted for handling ashes, coal or anything to be transported.

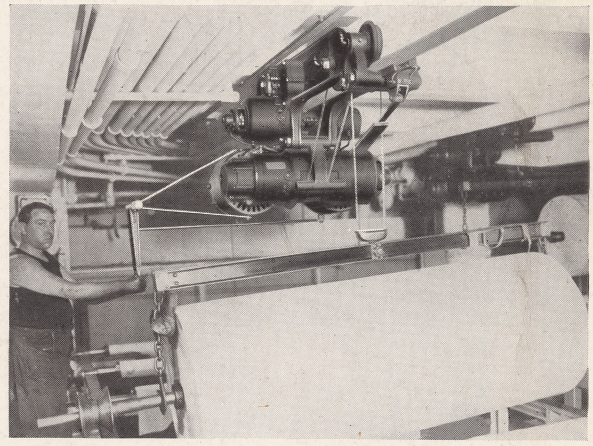
MAIN OFFICE AND WORKS, MONTOUR FALLS, N.Y.
NEW YORK PHILADELPHIA PITTSBURG CHICAGO

SHEPARD ELECTRIC CRANE & HOIST COMPANY

Lubrication. In SHEPARD HOISTS continuous lubrication of all parts is effected from four reservoirs of such large size as to prevent injury even though the supply of oil is replenished only at long intervals.

Only four conspicuous openings require oil and these are arranged so that a glance is sufficient to indicate the height of oil within the reservoir.

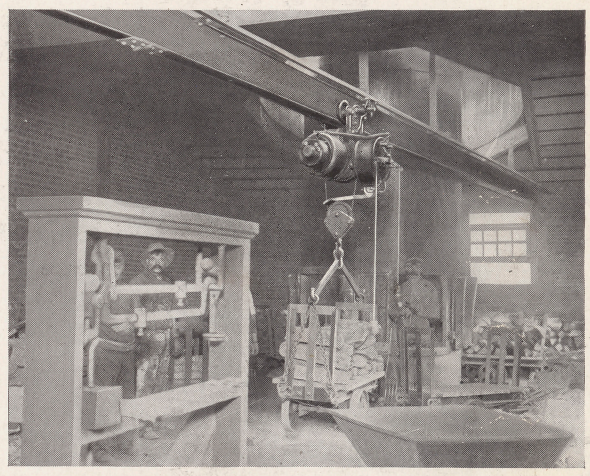
Accessibility. In the matter of accessibility of all parts, SHEPARD HOISTS are in a new class and are pre-eminent; they are built upon the unit system. The motor, controller, gearing and mechanical brake, electric brake, limit switch and winding mechanism are each absolutely independent of one another, any of the units are separately accessible and may be completely disassembled without disturbing any other unit. There are no internal screws, keys, or similar parts to give trouble in taking the hoist apart. The removal of external bolts releases all internal parts, which may then be lifted out with the hands.



No. 1. One of Three Special High Lift Hoists Installed by The New York World for Placing Heavy Rolls of Paper in Their New Duplex Press

No. 1. One of the especially advantageous features of "SHEPARD" Hoists is that special requirements can be met with standard hoist thus keeping down the cost. Note that the hoist illustrated is of standard construction but with special trolley.

No. 2. One of Several Hoists in the Foundry of Richey, Brown & Donald, Maspeth, L. I.



No. 3. Hoist Installed in the Plant of The Thatcher Furnace Company, Newark, New Jersey

No. 2. Hoist illustrated is lifting cope which is done so delicately as to not spoil the mold. Shepard Foundry Controllers afford sufficient control for the most exacting foundry service.

No. 3. The Hoist illustrated is used for serving cupola. Shepard Gear enclosure and method of lubrication assures dependability and long life under unfavorable working conditions such as these.

HOISTS FOR DC. ALSO FOR AC. **MAY WE SEND OUR HOIST HAND BOOK?**

MAIN OFFICE AND WORKS, MONTOUR FALLS, N.Y.

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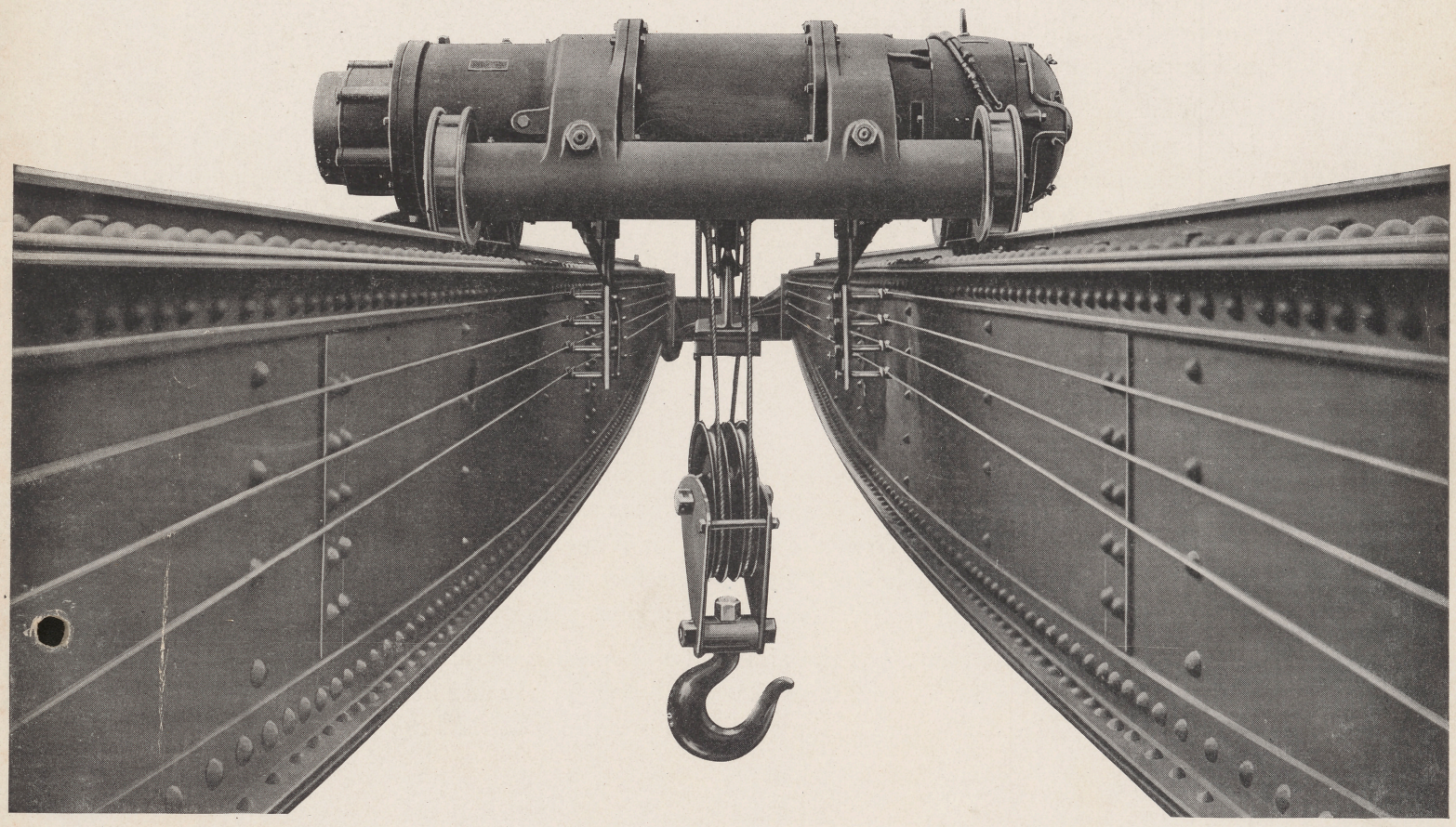
SHEPARD ELECTRIC CRANE & HOIST COMPANY
MONTOUR FALLS, N. Y.

ELECTRIC HOISTS PNEUMATIC HOISTS
COMPRESSION RIVETERS CRANES

BULLETIN NO. 58



ELECTRIC TRAVELING CRANES

INTRODUCTION

IN most lines of manufacturing some of the various forms of power Cranes or Hoists are now a necessary feature of the equipment employed.

Nearly every step in the various processes is so dependent upon the hoisting apparatus as to be, at least, seriously crippled in case, as sometimes happens, this is temporarily not in operative condition.

Cranes are necessarily located in an unfavorable position for cleanliness, or supervision by responsible persons. Their design should, therefore, have special reference to these unfavorable conditions.

It may be safely stated that insufficient lubrication, an accumulation of foreign matter in the working parts and rapid destruction of bearings, gear teeth, etc., due to defective alignment of related parts, is responsible for most of the difficulties experienced.

We believe that Shepard Cranes and Hoists are the only ones yet constructed which will maintain all the running parts in correct alignment, and thus keep the pressures and stresses in gear teeth, bearings, brakes, etc., within safe limits, and which have all working parts fully enclosed and a system of lubrication sufficiently simple and positive to insure economical and reliable service with ordinary care.

While we manufacture Cranes in all sizes ordinarily employed, attention is particularly invited to these machines in the small capacities; they are not, as is usual, improvised and adapted from other standard parts, but each of the small-size machines is a duplication on a smaller scale of those of large capacity. They will, therefore, be found to possess not only the essential features, but are also complete in the numerous small details of design, material, and workmanship which are so necessary for convenience, perfect performance, and reliability.

It is a generally recognized principle that high-grade machinery is necessary for successful and profitable operation. There is, however, often found a tendency to disregard this principle in the selection of very small machines.

In the selection of a Crane, no matter how small, it is a matter of experience that quality should never be sacrificed to price. Even the smallest Crane is no exception to the general rule, but rather, from the fact that it is more liable to overload, is more often operated by unskilled labor, and from the fact that it is small, more liable to damage from misuse or abuse, the general rule applies with even greater force.

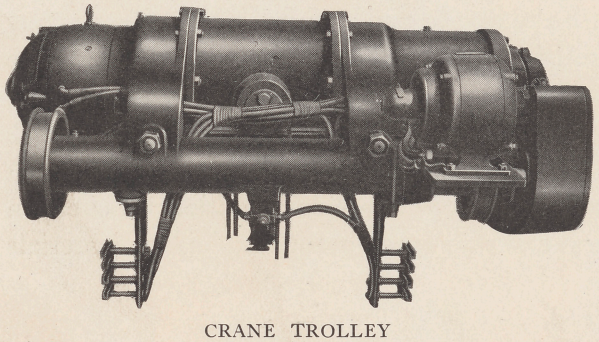
Recognizing these facts, it is the aim of the Shepard Electric Crane & Hoist Co. to produce the best grade of apparatus that can be made, whether its capacity is small or large, and having made sure of the quality to produce it at the lowest possible cost.

The Trolley. Although differing radically in some respects from the familiar forms in general use, our trolleys are not different in their mode of operation. The motors, electric brake, mechanical brake, gearing, etc., are employed in the usual manner. But to enable each of these to perform its work with the greatest reliability under the conditions usually found, they have been so designed and disposed relative to each other, that all running parts except the winding mechanism and truck wheels are enclosed within the main frame of the trolley; this frame is so shaped as to form a compact and rigid foundation for the working parts and at the same time a most effective enclosure.

Bearings for the winding drum and all other shafts are bored to correct locations in the frame, and then bushed generally with hard bronze. These bearings are therefore immovable and are not adjustable; thus their relation one to the other and to the shafts which they carry will be perfect and permanent.

The torsional movement which occurs in the framing of Crane Trolleys, due to inequalities in the track or runway on which the Crane travels or from wear of truck and trolley wheels and their bearings, has no injurious effect upon the Trolley of Shepard Cranes because all of the hoisting mechanism has a common axial position; the framing of the trolley is arranged to keep this axis constant under all conditions. All shafts will, therefore, have a constant position in their bearings and are in contact at all times with the entire bearing area and will run freely. All gear teeth retain their original adjustment, having a contact the entire width of face and thus distribute the stresses which they carry and the wear incident to their operation over the entire tooth surface.

In no case do any of the shafts pass through bearings in the walls of enclosures, but in all cases the shafts, with all their attached parts, are completely within the enclosure. There are, therefore, no openings through which oil or dust can pass. Because of this feature, it is practicable to fill the enclosure with oil, which will not leak out, evaporate, or become charged with grit.

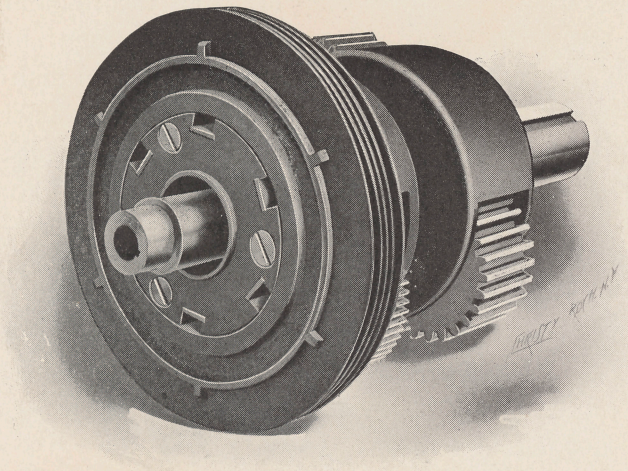


CRANE TROLLEY

In the assembly of the Hoist gearing, brakes, etc., no screws, nuts, bolts, pins, keys, or other similar devices are used. The parts are simply placed in their proper relative position within the enclosure, and are properly secured for operation by bolting the cover of the enclosure in place.

All of the Hoist gearing, electric and mechanical brakes and trolley drive gearing are contained in three enclosures, two of which intercommunicate and have a common supply of oil.

Hoist Gearing. The Hoist gearing consists of a double train of machine-cut spur gears having three speed reductions. The motor pinion and all of the gears, except the intermediate set, drive at two points diametrically opposite, thus dividing the work among double the number of teeth which would be in contact by the usual arrangement. The stresses are, therefore, so balanced in the pinions as to impose no side pressure whatever upon the shaft bearings.



HOIST GEARING

SHOWING ALL RUNNING GEARS AND MECHANICAL BRAKE PARTS

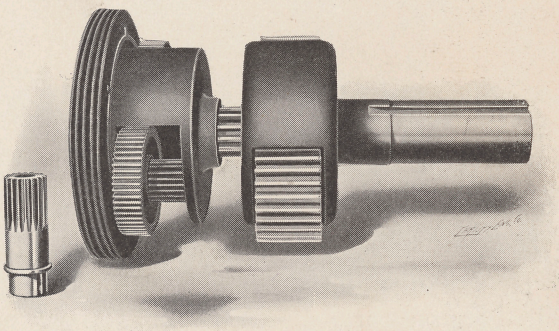
This arrangement permits all gears to be made extremely heavy in proportion to the loads imposed upon them, while at the same time the gear train is sufficiently compact to be placed entire with all its shafts and bearings within a single enclosure, which also affords room for the mechanical or load brake.

Load Brake. No part of the Electric Crane or Hoist exceeds in importance the mechanical or load brake. Very much of the efficiency and safety with which loads are handled depend upon its careful design, and a proper selection of materials and choice of conditions under which it operates.

In Shepard Cranes and Hoists the friction surfaces of the brake are at rest while the load is being hoisted, therefore no power whatever is consumed by the brake. In lowering the load about 80% of the work done by the motor in hoisting is given out in the form of heat, nearly all of which is developed at the frictional surfaces of the brake. To enable these parts to endure properly the hard work and relatively high temperature, they are mounted in the same enclosure as the Hoist gearing, where they are constantly bathed in oil, which, by circulation, distributes the heat generated over the large surface of this enclosure from which it is radiated to the surrounding air. The rapid dissipation of the heat generated assures an unusually low temperature of the brake mechanism, which in connection with the ample and positive lubrication renders any damage to the brake impossible. The frictional surfaces of the brake are of large area, all of which is subject to an even and moderate pressure. The wear and heat generated are, therefore, evenly distributed instead of being localized and very intense at certain portions, as in brakes of the coil type.

Advantage has not been taken, however, of these favorable conditions to cheapen the construction; on the contrary, the brake surfaces are bronze and iron, materials adapted alike to withstand severe frictional contact and high temperature. The fact that neither the frictional nor temperature conditions are as severe as is usual, guarantees the greatest reliability and durability.

No springs or pawls are used in the construction of the brake; only such parts are used as from their simple construction and reliable nature guarantee reliability.



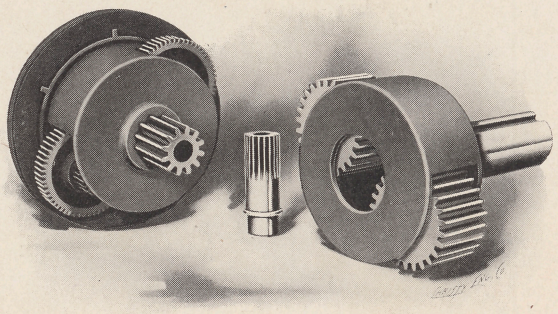
HOIST GEARING

When current is cut off from the

hoisting motor, the load does not lower slightly before it is retained by the brake, but is held firmly and without jar.

Unlike other load brakes with which we are familiar, the hoisting motion is not transmitted through the brake, but takes place independently and with the brake at rest; hence, if the brake were disabled, it would not affect in the least the reliability or safety with which the load is lifted.

In operation, the brake follows usual methods. The holding power is always slightly in excess of that necessary to sustain the load. In lowering, some effort from the motor is necessary to cause the load to descend. The tension upon the frictional surfaces of the brake is always proportionate to, and is determined by, the load. Any tendency of the load to exceed a speed corresponding to that of the motor increases the brake tension until perfect agreement is restored between the actual speed of the load and the natural speed of the motor.



HOIST GEARING

Electric Brake. The electric brake is provided, not as a means of holding or controlling the descent of the load, although it is capable of doing so, but to bring the hoisting motor promptly to rest as soon as current is cut off, either accidently or intentionally. It is of the well-known Weston type, consisting of alternating, fixed and rotating discs of bronze and iron, running in an oil and dust-tight enclosure.

The winding of the electric brake is so disposed that no oil can possibly reach it. It is connected in series with the Hoist motor, so that by no accident can the brake fail to release when current is flowing to the motor, or fail to hold when current is cut off.

The application of the electric brake to Shepard Cranes and Hoists differs from usual practice, in that it is not connected to the motor, but to an extension of the motor pinion. This important improvement leaves the motor free of all complication, and places the brake where it cannot fail to act upon the Hoist, since there are no couplings between it and the Hoist gearing.

Automatic Limit Switch. An automatic limit switch is mounted directly upon the trolley which opens the circuit to the Hoist motor when the Hoist hook reaches its upper limit of travel.

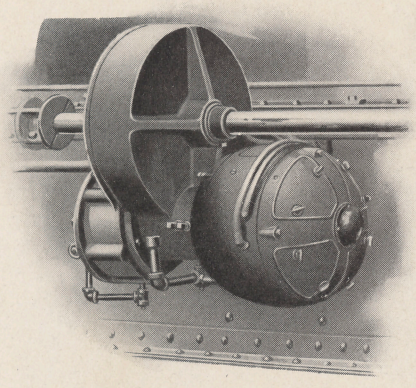
This safety device does not depend upon a secondary electric circuit for its operation, and cannot, therefore, become inoperative by an open circuit, such as would be caused by a broken wire or displaced collector shoe.

The load hook may be lowered as usual, after its upward movement has been arrested by the limit switch. A slight downward travel of the load hook closes the circuit of the hoisting motor automatically.

Trolley Drive Gearing. The movement of the trolley along the Crane bridge is obtained by a train of spur gears effecting two speed reductions. These gears are all carried in an oil and dust-tight case having no projecting shafts, hence there is no point at which oil can leak from the case, or dust enter. All of the gearing is mounted upon shafts supported by the case at each end.

It is a very unusual and desirable feature of this gearing that it may be operated with the cover of the enclosing case removed, thus allowing inspection of all parts while in motion, before they are enclosed.

The trolley gearing transmits its motion to one trolley wheel on each girder of the Crane bridge.



BRIDGE MOTOR AND GEARING ENCLOSURE

Bridge Motor Gearing. The bridge motor and gearing are usually located at or near the center of the span. The gears are mounted in an oil and dust-tight case to which the bridge motor is directly attached. Bearings for the bridge shaft and motor armature shaft are located in the walls of the gear case. By this means the bearings are kept in correct relation to each other and their alignment is not affected in the least, either by the heavy stresses sometimes set up in this gearing or by vertical or horizontal loading of the bridge girders.

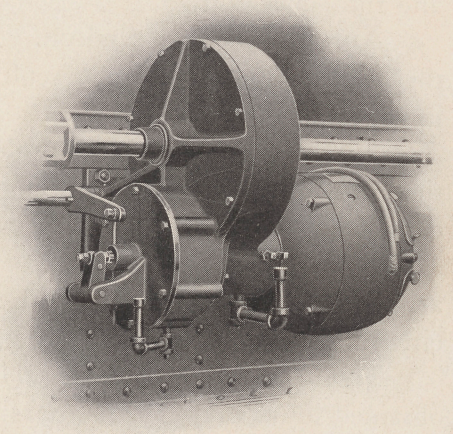
The entire group of parts, consisting of the bridge motor and bridge gearing with their enclosing case, are self-contained, and are attached to the bridge girder by a single set of bolts, which are subject to practically no strain except that due to the weight of these parts.

Access is had to the gearing by removing a cover from the gear case, which is independent of the moving parts. The bridge motor and gearing may, therefore, be operated and inspected under working conditions while the case is open.

Unlike all of the enclosures about the Hoist gearing, the mechanical and electric brakes and trolley gearing, the bridge motor gear case has shafts projecting through its walls. Leakage of oil is, however, reduced to a minimum by drainage channels, which collect the oil passing along the shaft, and return it to the interior of the case, while dust is excluded by dust collars running in contact with the bearings.

Bridge Foot Brake. A powerful brake is provided which acts directly upon the bridge-motor pinion. For cage-operated Cranes this brake is applied by a spring, and is released by a foot pedal conveniently placed in the operator's cage. This method of applying the brake has been found preferable, since a definite amount of brake power is available, irrespective of the weight of the Crane operator, a fractional part or all of which can be applied, as may be needed. When the Crane is not in use the brake is always automatically set full power, and cannot in the case of yard Cranes be drifted by the wind while the operator is absent.

The frictional surfaces of the brake are within the same enclosure as the bridge motor gearing, where they are protected from grit and

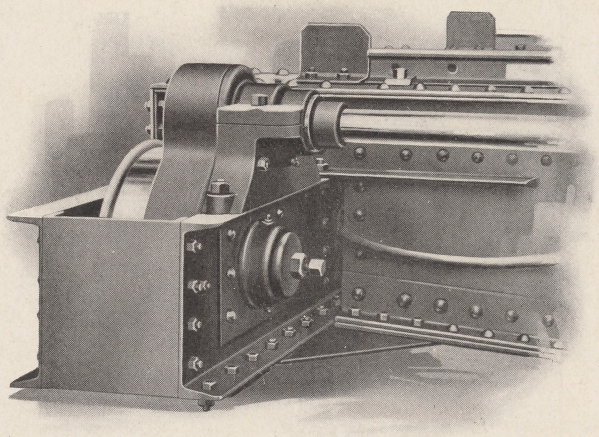


BRIDGE MOTOR, GEARING, AND BRAKE ENCLOSURE

are also thoroughly lubricated. In this connection attention is invited to the fact that all brakes on Shepard Cranes are made of anti-friction materials and run in oil. This detail of design has been chosen after very careful consideration of the subject and much experience, both with anti-friction materials and those having a high coefficient of friction, running both dry and lubricated. It has been found that uniform holding power and small loss of adjustment from wear are only obtainable with anti-friction surfaces running in oil.

The small amount of work done per unit of area and pressure guarantees low temperatures and great durability and reliability.

Uniform holding power is impossible except with thoroughly lubricated surfaces. Differences of several hundred per cent. have been observed in the holding power of the same brake where lubrication was variable. We have, therefore, chosen a design insuring constant lubrication and, therefore, unvarying holding power.

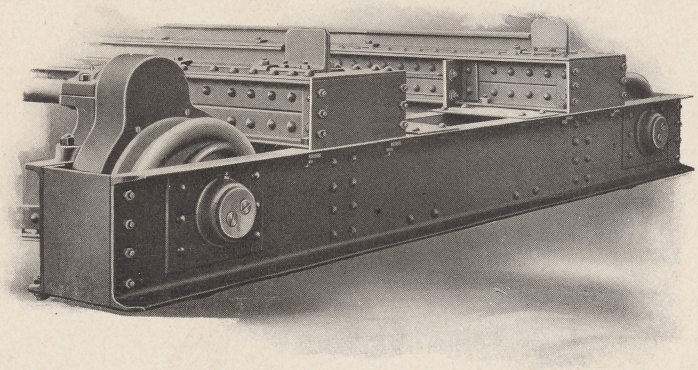


BRIDGE TRUCK
SHOWING TRUCK-GEARING ENCLOSURE

Bridge Truck Gearing. The bridge or squaring shaft, which is made unusually heavy, extends the entire length of the Crane bridge and carries pinions at its end, each of which engages a gear bolted directly to the bridge truck wheels. Exactly equal motion is thus transmitted to each end of the Crane. Like all the other gearing, the bridge truck gears run in enclosures, but owing to the slow motion of these gears, the difficulty of retaining oil in enclosures having shafts projecting through the walls and the advantage which arises from keeping the runway rail perfectly free from oil, no provision is made for an oil bath in these enclosures. Grit and dust are effectually excluded, however, and all danger of objects falling into the gears is avoided.

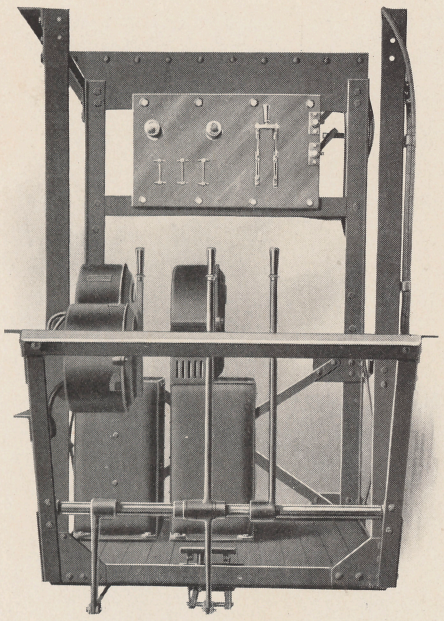
For Cranes having a travel speed of 350 feet per minute or more, we can omit the gearing entirely from the bridge truck, thus greatly simplifying the truck construction.

Bridge Trucks. The bridge-end trucks will vary slightly in design, but are usually of structural steel of open-box construction. Except sometimes in the case of Cranes which require overhung wheels, the truck framing entirely surrounds the wheels, which are double flanged with chilled and ground treads, and have axles keyed into the hub.



BRIDGE TRUCK

The axles run in bronze bushed self-aligning bearings, set into openings bored in the truck framing.



CRANE CAGE

The axle bearings are self-oiling and are removable bodily from the truck by removing a single screw.

Since the truck wheel gears are bolted directly to truck wheels, the axles are relieved from torsional stresses and there is no tendency for them to become loose in the wheel hubs.

Bridge. The design of the bridge will vary to meet the conditions of loading, span and speeds required.

The Crane bridge is so designed and proportioned as to show very little vertical or lateral deflection in service. Experience proves that when possessed of these characteristics the unit stresses will be considerably below those usually specified, rarely exceeding 10,000 pounds per square inch of cross section.

The bridge girders usually rest upon and against the side of the trucks, and are connected by close fitting bolts as well as by gusset plates of sufficient size to keep the Crane perfectly square under all conditions.

Operator's Cage. The operator's cage is built of large-size angles connected by braces and gusset plates, and so connected to the Crane bridge and truck as to be free from vibration when Crane is in motion.

The operator's cage is provided with a switch-board of enameled slate upon which are mounted runway current collectors, switch, fuses, pilot lamps, etc.

A foot-walk is usually provided with cage-operated Cranes, extending from the cage along the entire length of the Crane bridge, giving convenient access to the bridge motor, gears, bridge brake, shaft bearings, and Crane trolley.

A walk is also provided for a short distance along the opposite girder, from which convenient access is had to the hoisting motor. Both walks are provided with a substantial hand-rail.

Controllers. No portion of the Electric Crane or Hoist equipment is of greater importance than the electric controllers. To a large extent, the performance of the whole machine will depend upon the manner in which the controller performs its work.

Not only should the controller be capable of reliably starting, stopping, and reversing the motors, but it must be capable of varying the speed through a much larger range than for any other kind of service. If the maximum hoisting speed of the Crane or Hoist is high, the minimum hoisting speed will generally be too high for certain delicate operations, unless the controller affords a much larger measure of control than is usual.

To meet these conditions, a system of control has been developed which represents the extreme of refinement in this particular, together with unusually durable and reliable construction.

The range of lifting speeds is not only unusually wide, but a large number of

intermediate points are provided, so that speed variations progressing in almost imperceptible steps are afforded.

The carrying capacity of the controller is made very large, not only as to its conductors, contacts, etc., but the resistance which is usually mounted in the controller proper is also proportioned on the same ample scale.

Powerful blow-out magnets are provided, capable of promptly disrupting the arc formed when the circuit is opened, while all contacts are easily renewable without opening the controller or disturbing any of its connections.

An unusual feature of these controllers, which are of the face-plate type, is that, consistently with the design of the entire Crane, all their working parts are enclosed and are thus protected from dust which so soon impairs, and quickly destroys, the sliding contacts used in all successful controllers.

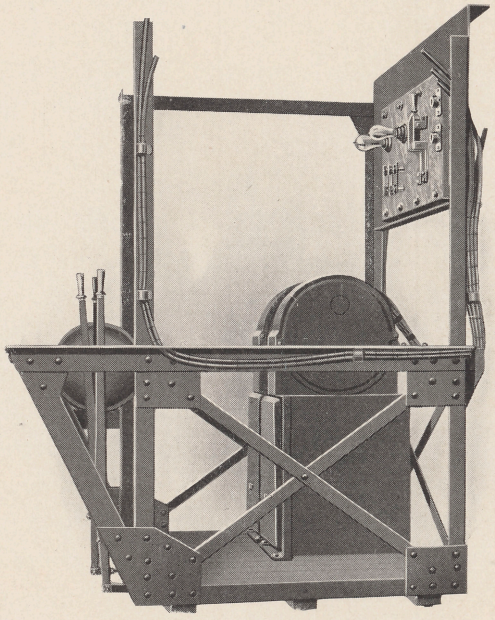
The disposition of the resistance is such that access to it is unusually convenient. For round type controllers, such as are usually used for the trolley motion, the resistance is attached to the back of the controller face-plate, which, with the attached resistance, may be removed from the case without disconnecting a single wire or any other element except the screws which hold the face-plate in place.

The box type controllers, such as are usually used for hoist and bridge motions, are arranged with the resistance in six units of convenient size for handling, each mounted in the controller like a drawer in a desk. It is, therefore, only necessary to withdraw any one of these units desired without disturbing others.

Wire wound or cast grid resistance is used as may be suitable for the H. P. and voltage employed. In either case, any unit or grid may be removed from a group without disturbing other units or grids. The entire controller is made up of non-combustible materials and insulated with mica, asbestos, and slate. All connections are accessible at the front of the controller. A group of several controllers may, therefore, be placed as close together as possible without preventing or rendering inconvenient access to any part whatever.

Motors. As the result of a great deal of experience, we are able to offer our Cranes equipped with motors especially adapted to the requirements of Crane service and entirely free from the objections which the peculiarities of the service usually entail.

Crane motors, particularly those used for the hoisting motion, should be so wound as to accommodate automatically their speed to the loads handled, in order that the light and medium loads may be moved at relatively high speeds, and the maximum loads at relatively slow speed. All Crane motors have these characteristics to some extent, but it has usually been impossible to secure all of the automatic speed variation which is desirable without serious trouble with commutator and brushes.



CRANE CAGE

By the use of interpole motors, however, a nearly uniform rate of drop of the saturation curve between maximum and minimum load is possible with a corresponding nearly uniform speed variation and perfectly sparkless commutation. The interpoles neutralize the distorting effect upon the field of the widely varying armature reaction, due to widely varying current strength; hence, neither light loading with a corresponding acceleration of speed or heavy over-loads with a corresponding drop in speed sensibly affect the commutation, which is sparkless under these varying conditions.

By our system of construction the motor becomes an integral part of the Crane, each being especially designed one for the other, and both for the conditions found in this class of service.

Hoisting Cable. The superiority of wire rope over chain has, we believe, been too thoroughly established to admit of any uncertainty, providing rope of a proper quality and construction is used in connection with drums and sheaves of suitable size. Our Cranes are equipped with wire rope only and that of the highest quality obtainable. Attention is invited to the more detailed description of the rope used, contained in the specification accompanying our proposal.

Load Block. The load blocks for Cranes of all sizes are, aside from the sheaves, entirely of wrought steel, very massive and so formed as to protect the wire cable from heat radiated from ladles of molten metal, etc. Handles are provided for the convenient manipulation of the block, and to avoid the possibility of workmen placing their hands where they will be injured.

Lubrication. A reading of the foregoing description will indicate, in a general way, the care which has been exercised in the construction of Shepard Cranes, to insure protection of all working parts from foreign matter and to afford reliable and ample lubrication.

The importance of the subject and the remarkably perfect provision afforded in these Cranes for thorough lubrication warrants a detailed description of these features.

The advantages of oil over grease lubrication are undoubted, not only because of its higher efficiency as a lubricant but because it will flow readily and is not sensibly affected by ordinary changes of temperature.

Inability to apply oil successfully and reliably to the Crane must account, therefore, for its partial or complete disuse in some designs.

Convinced that the Crane or Hoist deserves the more efficient and reliable oil lubrication, and that the one objection heretofore observed, viz: the tendency of the oil to leak and drip from the Crane, could be avoided, our designs have gradually developed until complete success has finally been obtained.

The Hoist gearing, mechanical brake, electric brake, cable drum bearings, and hoisting motor bearings draw their oil supply from two reservoirs, each of large capacity; so that oil supplied at two points only lubricates this large and important group of parts.

The oil supply does not depend upon means which may fail to operate. The parts which require lubrication are either partially submerged in the oil or are placed just above it and are constantly supplied by oil rings.

As the enclosure which contains the oil forms an unbroken envelope about the entire hoisting mechanism, including all shafts and bearings, it can be made perfectly tight against leakage, evaporation, or contamination of the oil by grit or dust.

Running as they do in a bath of clean oil, these parts operate under the most nearly perfect conditions possible.

The trolley and bridge drive gearings are each oiled in all their parts by a single application of oil in sufficient quantity to partly submerge the gears, while the oil supply is retained and kept perfectly clean by the enclosures about them.

The trolley and truck axles, bridge-shaft bearings, and such of the motor and shaft bearings as are not otherwise supplied, are oiled by rings running into an oil reservoir beneath the bearings. These reservoirs are completely enclosed so as not to admit dust, and have drain plugs from which all old oil can be removed when desired.

An oil receptacle is provided in the hub of the lower block sheaves, giving to this important bearing constant and perfect lubrication.

Each oil reservoir is provided with a large oil cup so located that when the cup is filled to the top the oil level in the enclosure will be exactly right for the most efficient lubrication of the parts within the enclosure. By removing the cap from the oil cup the oil level in the reservoir can be conveniently observed.

SOME SUGGESTIONS

In asking for quotations the following information should be given: *capacity*, *span*, center to center of runway rails, *lift*, of the hook, or *height* from floor to top of runway rail, *distance* from top of rail to roof or ceiling, from center of rail to side wall of building, *size* of runway rail, *speeds* for *Hoist*, *trolley*, and *bridge* motions and *voltage* of electric current available.

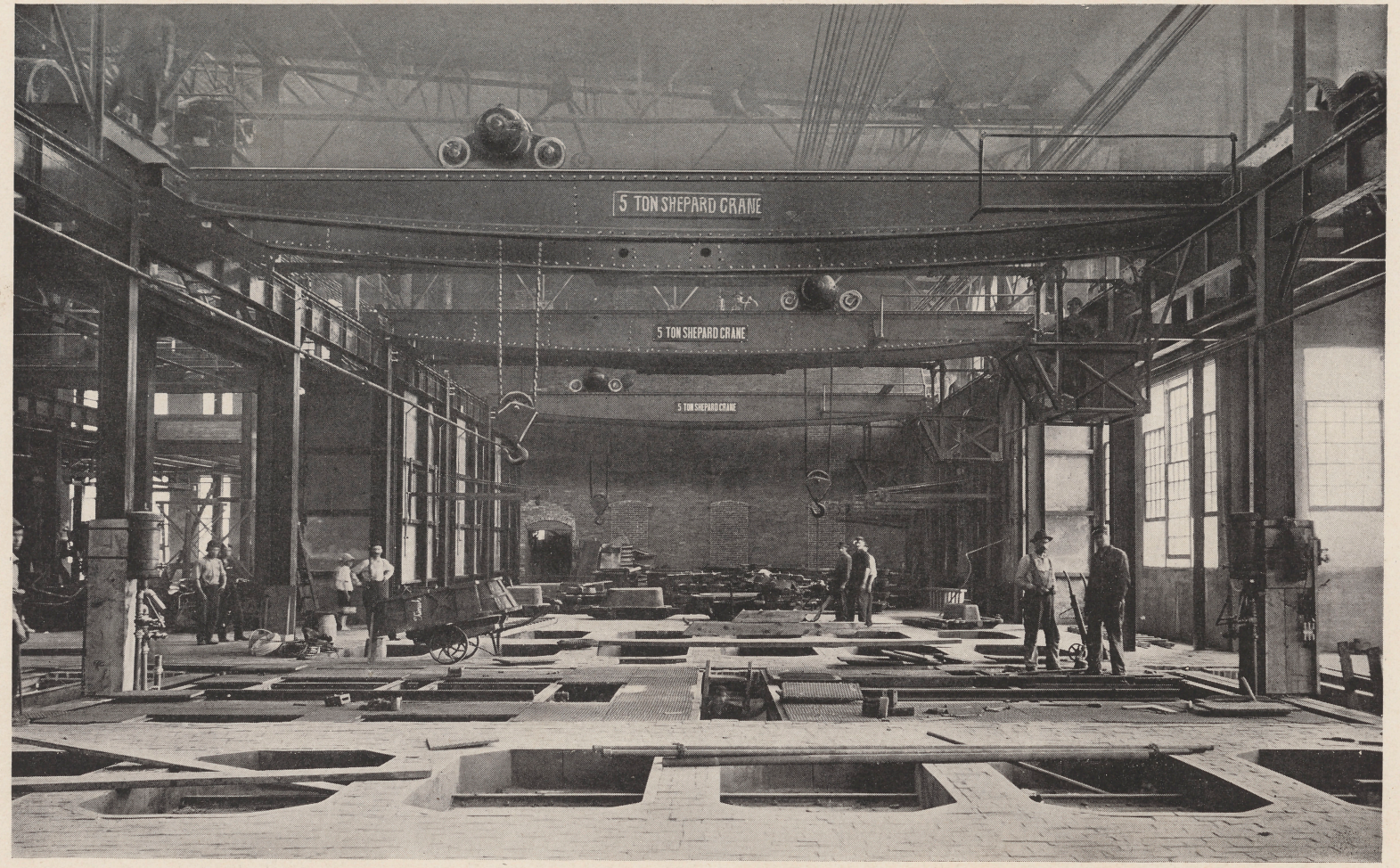
We advise the use of 220 volts direct current for Cranes wherever possible; higher voltage is more difficult to handle satisfactorily, and requires more care to avoid grounds and short circuits. Lower voltage is less economical in the matter of conductors, etc. While less desirable, it is satisfactory for small and medium capacity.

When in doubt as to the proper speeds, especially for foundry service, it is better to choose the lower rather than the higher of two speeds. "Haste often means waste."

We advise purchasers to specify *carefully* what is required in the way of service from the Crane, and conditions under which it must operate, but it is preferable to leave the Crane builder free to exercise his judgment as to the methods and materials to be used in meeting these requirements and conditions.

We advise purchasers, when possible, not to include the building of foundations, runways, placing of electrical machinery or wires in contract for the Crane. It is also preferable for a purchaser to supply his own labor for erecting the Crane under the advice of a superintendent of erection supplied by the Crane builder.

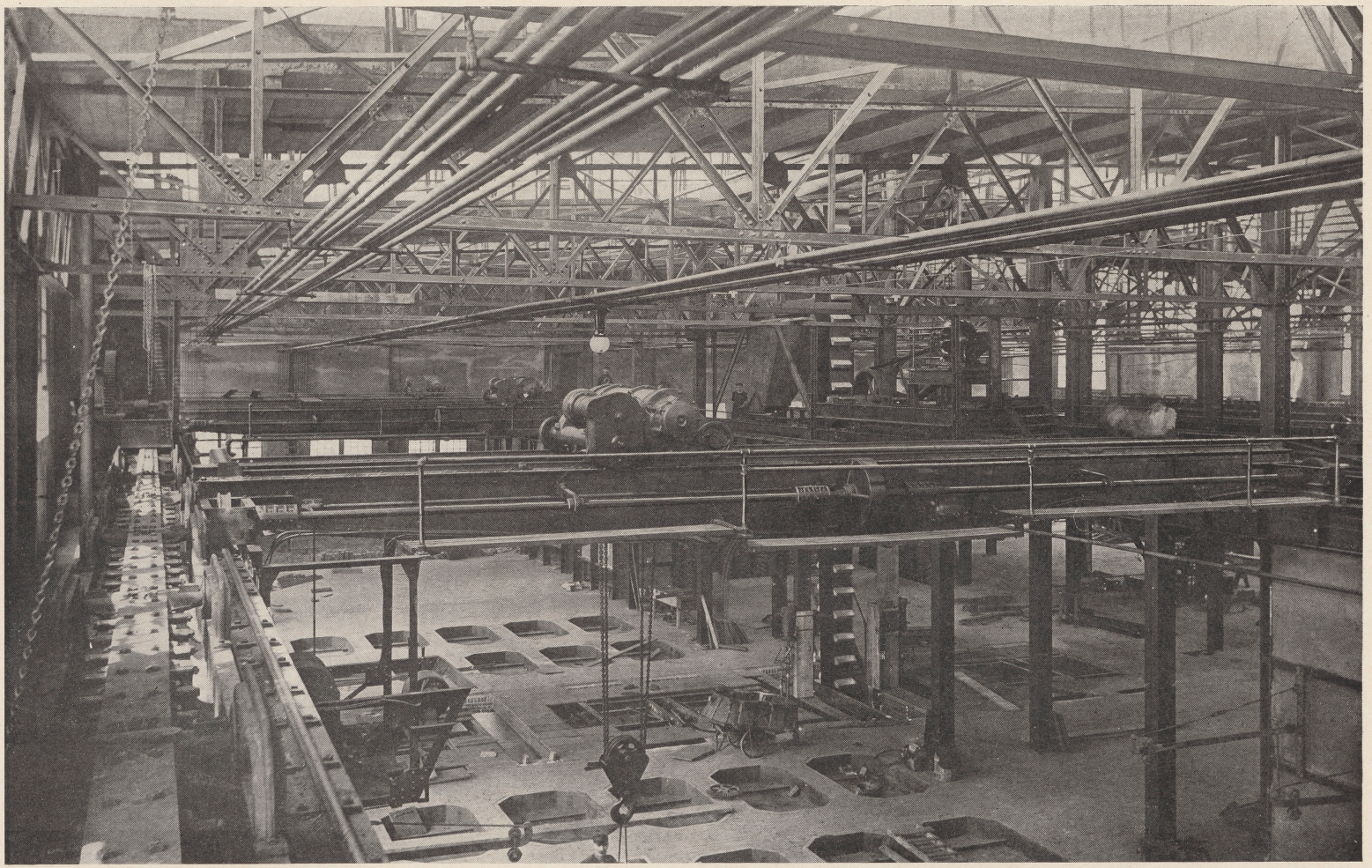
The cost of such work, unless the quantity is large, will generally be much less if performed by a local contractor or by reliable workmen, usually employed by, and responsible to, the purchaser.



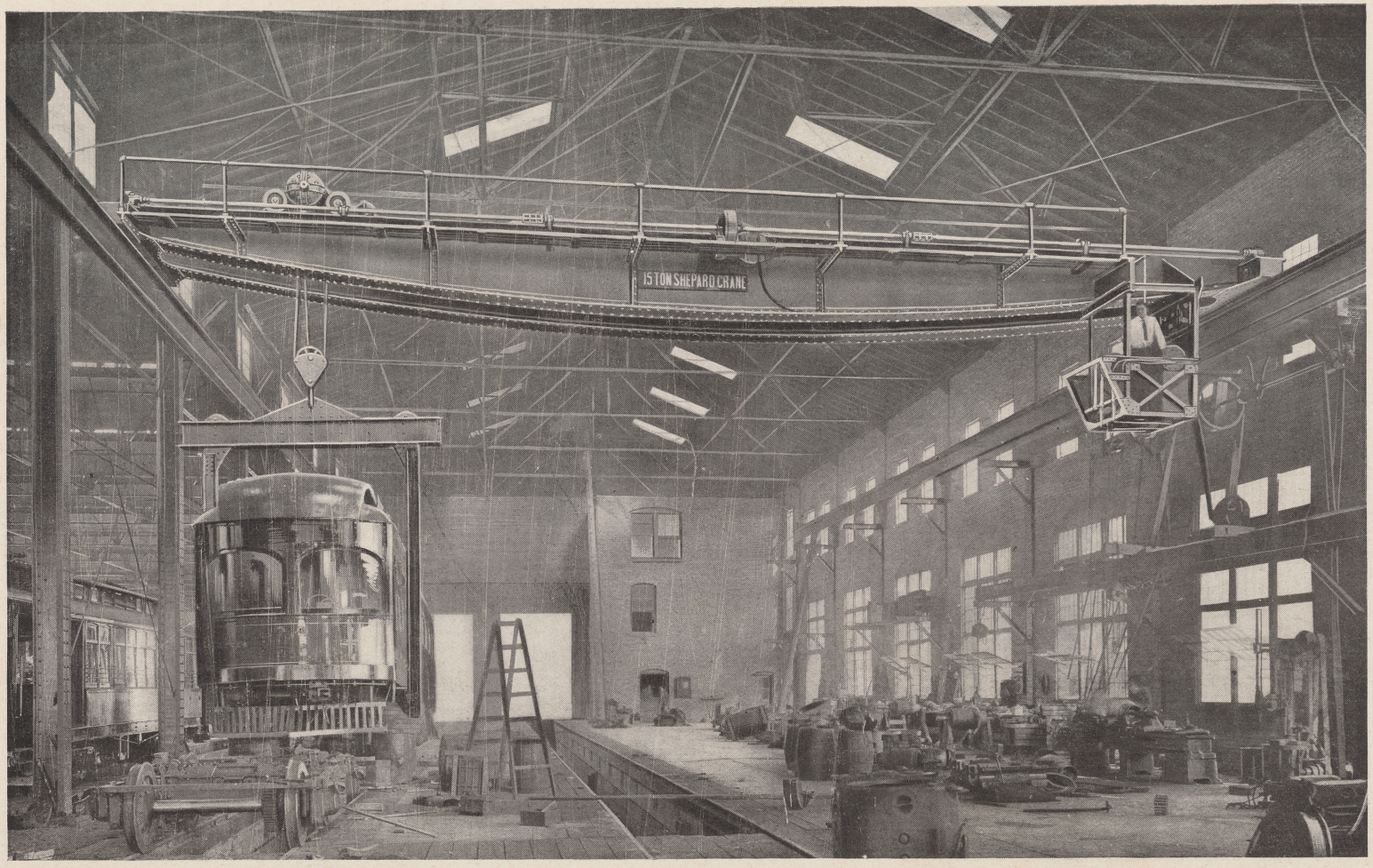
THREE 5-TON CRANES

Lift, 26 feet Span, 40 feet

IN SERVICE IN A FOUNDRY



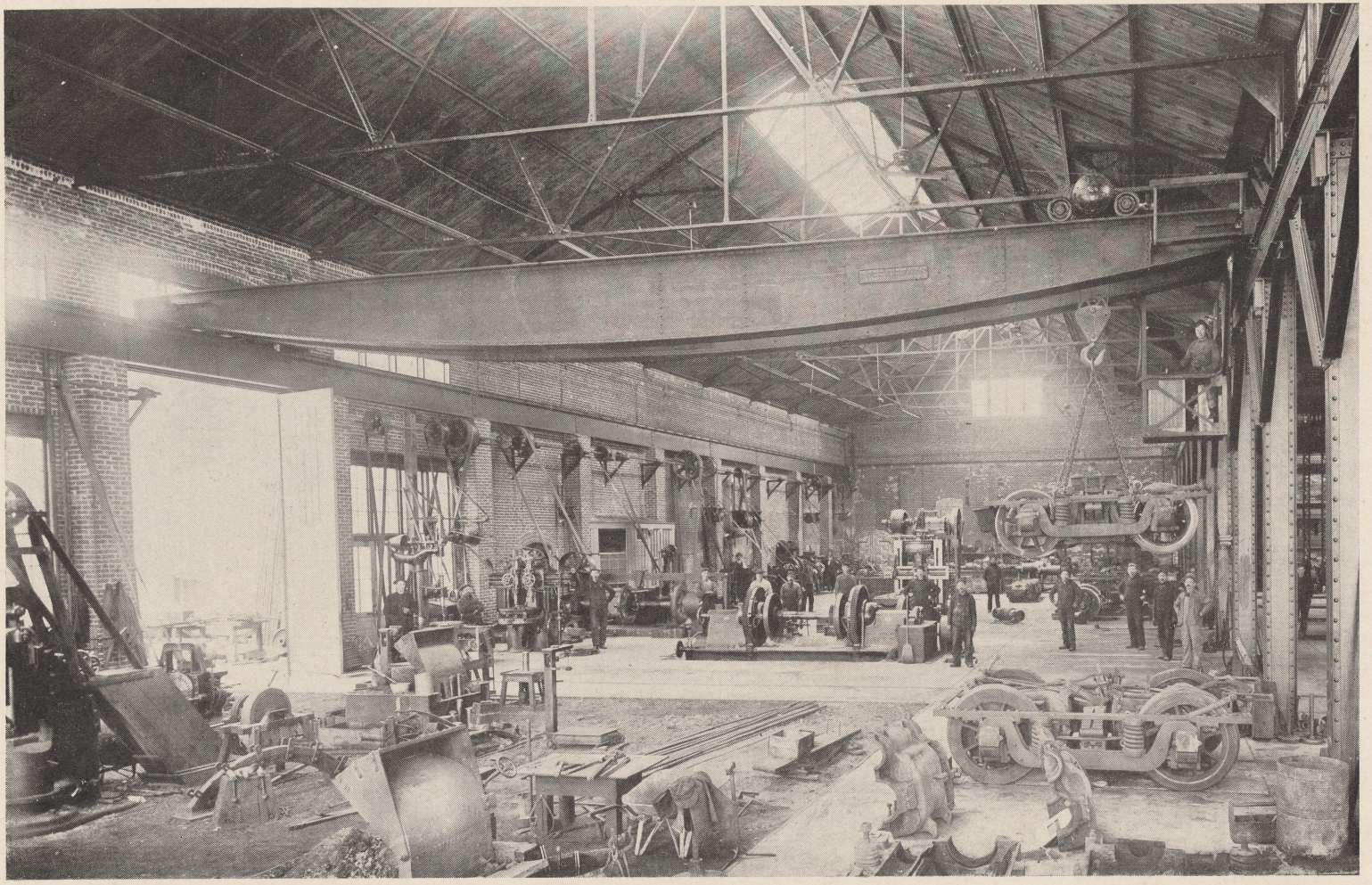
THREE 5-TON CRANES
Lift, 26 feet Span, 40 feet
IN SERVICE IN A FOUNDRY



15-TON CRANE

Lift, 30 feet Span, 58 feet, 9½ inches

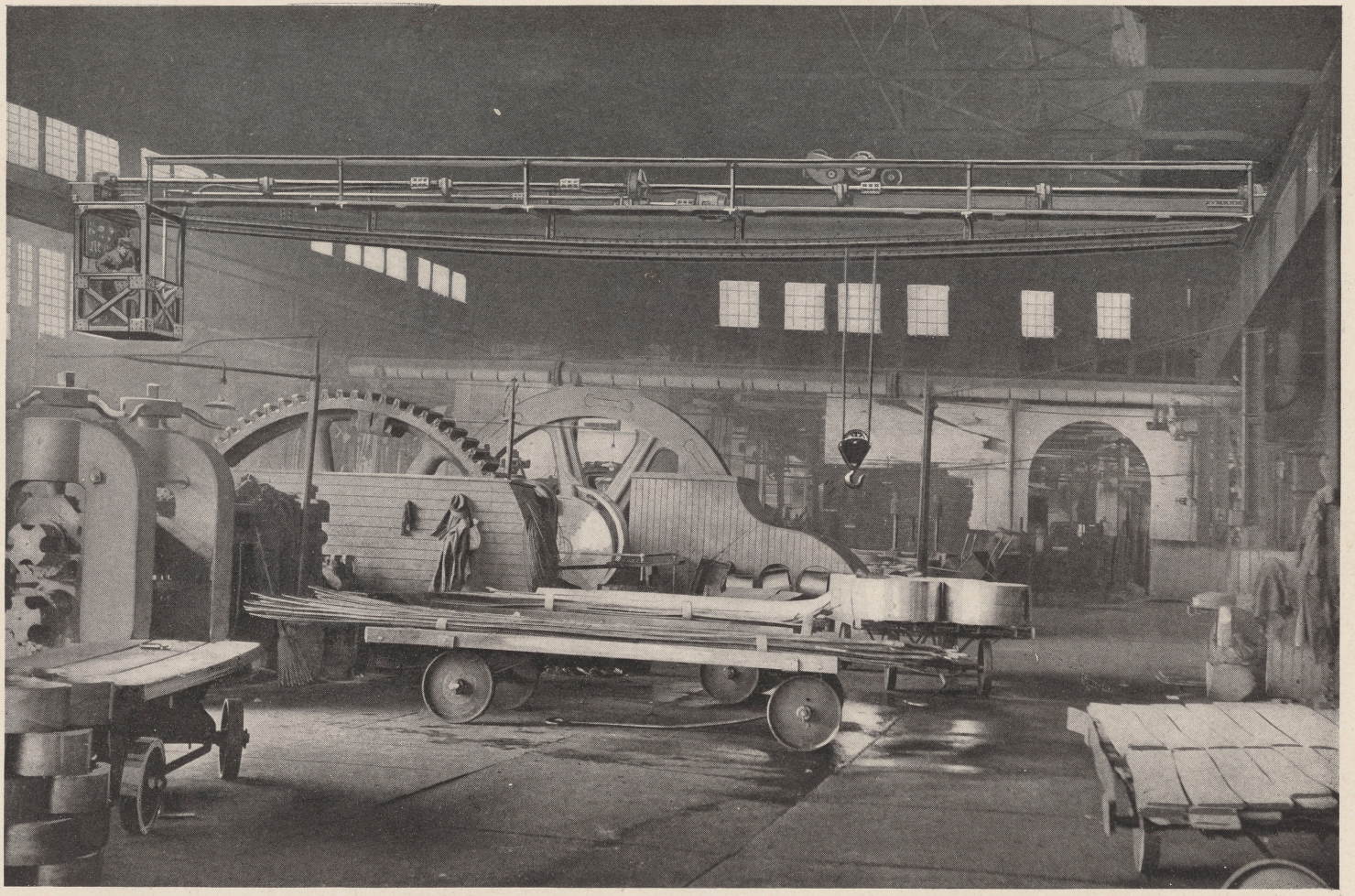
IN SERVICE IN AN ELECTRIC RAILWAY REPAIR SHOP



15-TON CRANE

Lift, 20 feet Span, 57 feet, 1½ inches

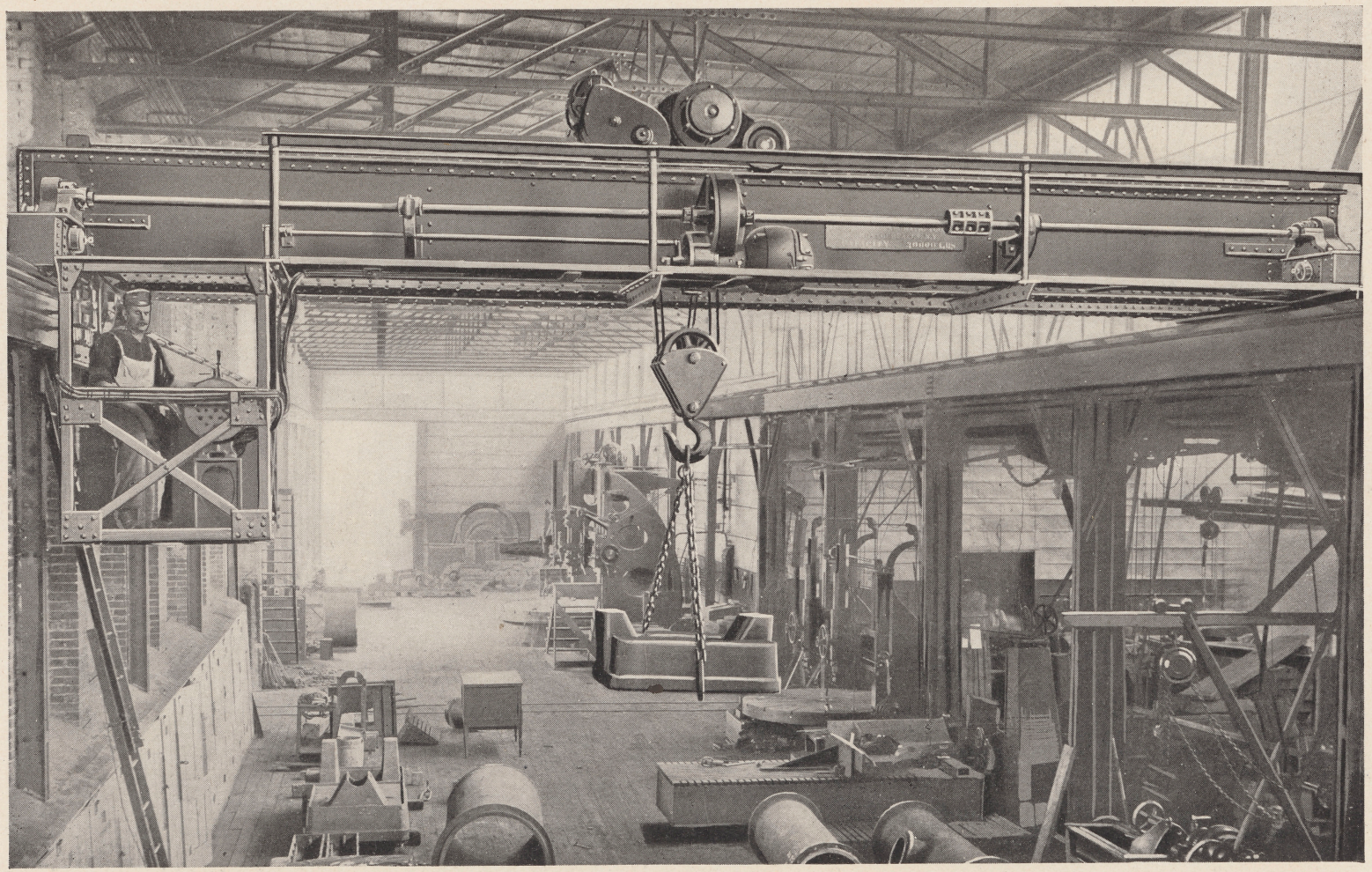
IN SERVICE IN AN ELECTRIC RAILWAY REPAIR SHOP



7½-TON CRANE

Lift, 30 feet Span, 68 feet, 4 inches

IN SERVICE IN A ROLLING MILL



15-TON CRANE

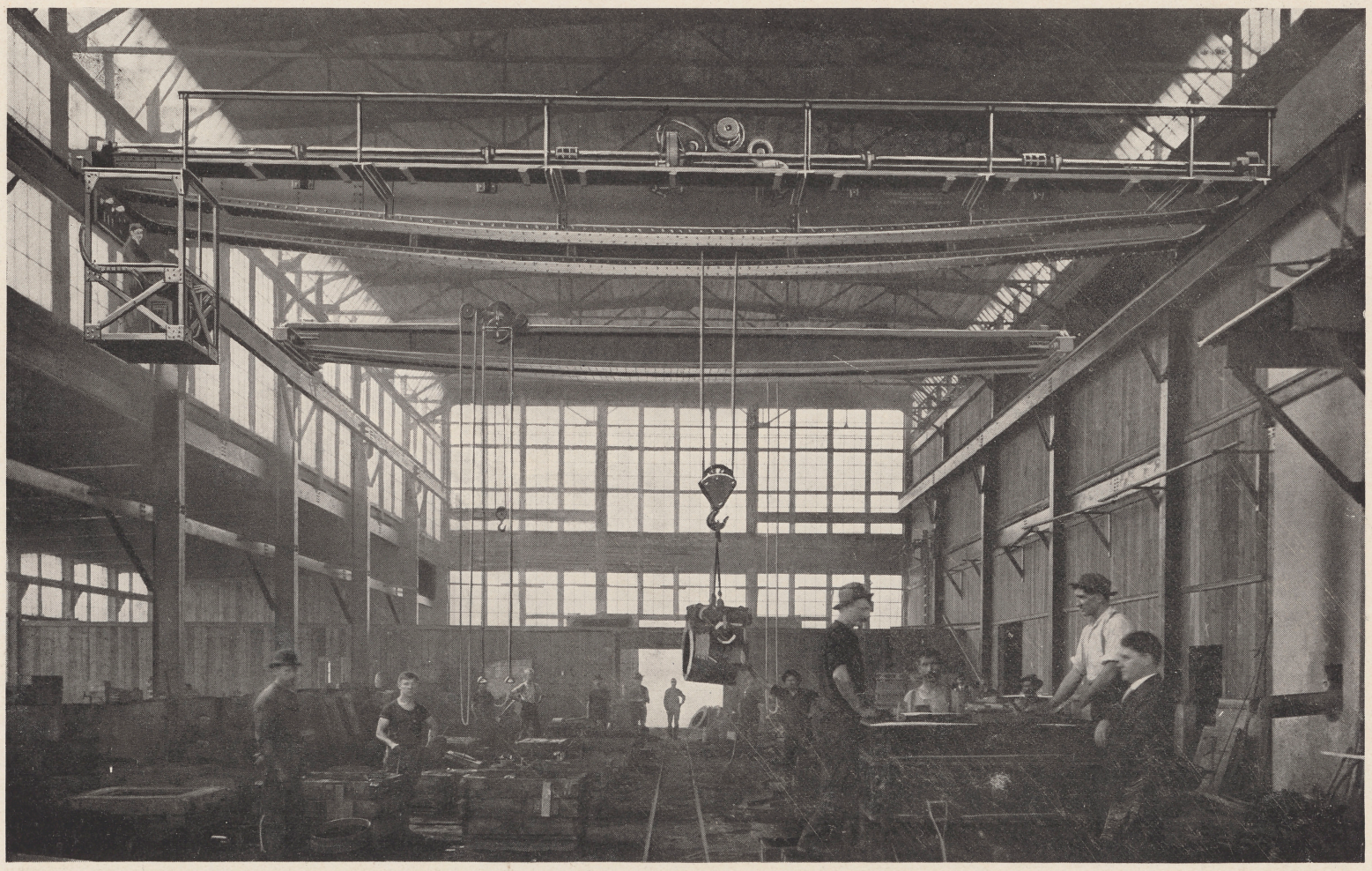
Lift, 20 feet Span, 29 feet, 4 inches

IN SERVICE IN A MACHINE SHOP

10-TON CRANE

Lift, 25 feet Span, 44 feet, 10 inches

IN SERVICE IN A GRAY IRON FOUNDRY



ONE 10-TON AND ONE 5-TON CRANE
Lift, 26 feet Span, 50 feet
IN SERVICE IN A STEEL FOUNDRY

10-TON CRANE

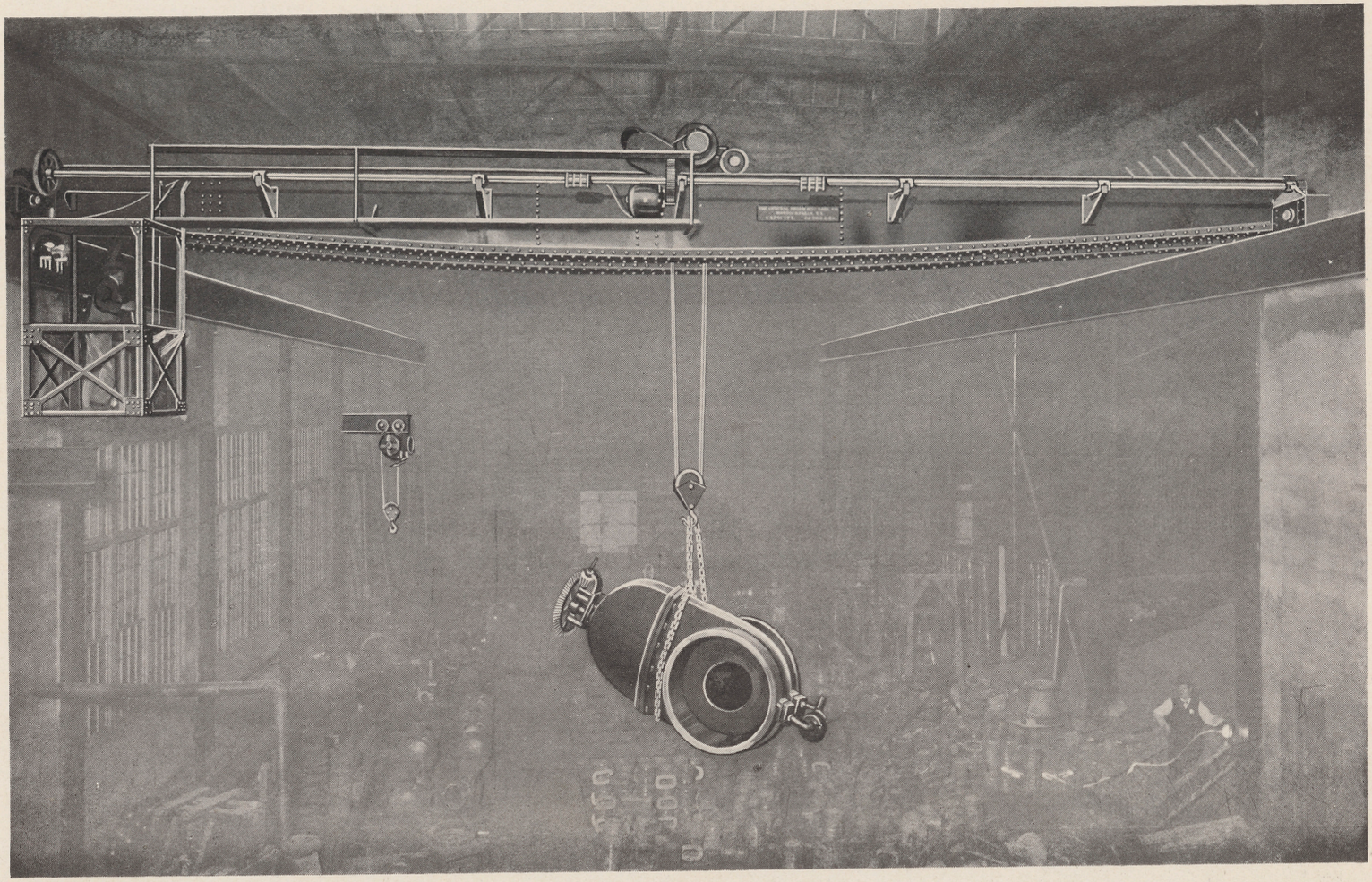
Lift, 35 feet Span, 36 feet

IN SERVICE IN A MACHINE SHOP

TWO 5-TON CRANES

Lift, 25 feet Span, 48 feet

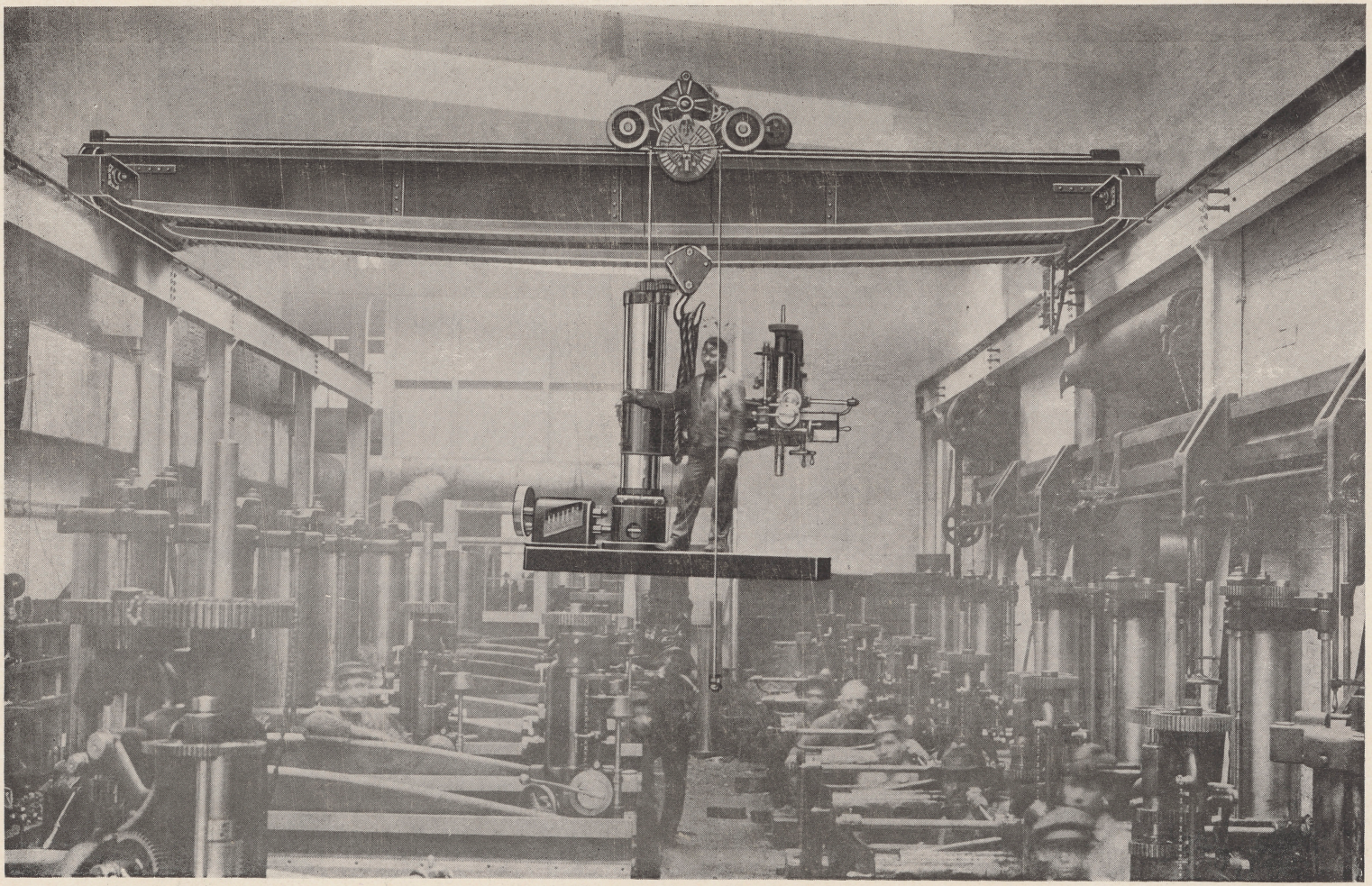
IN SERVICE IN A GRAY IRON FOUNDRY



10-TON CRANE

Lift, 35 feet Span, 49 feet, 4 inches

IN SERVICE IN AN ERECTING SHOP



10-TON CRANE

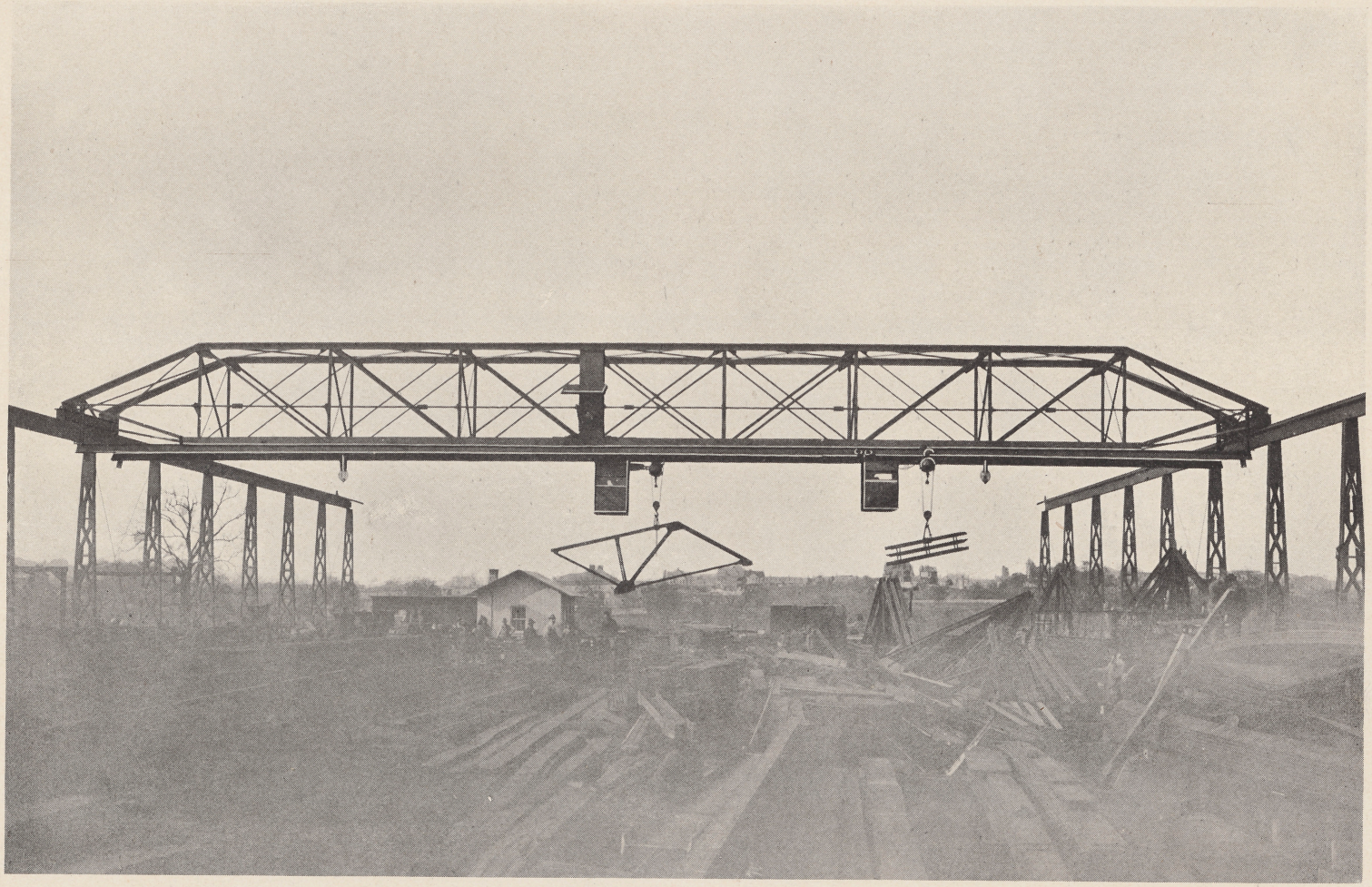
Lift, 17 feet Span, 26 feet, 8 inches

IN SERVICE IN A MACHINE SHOP

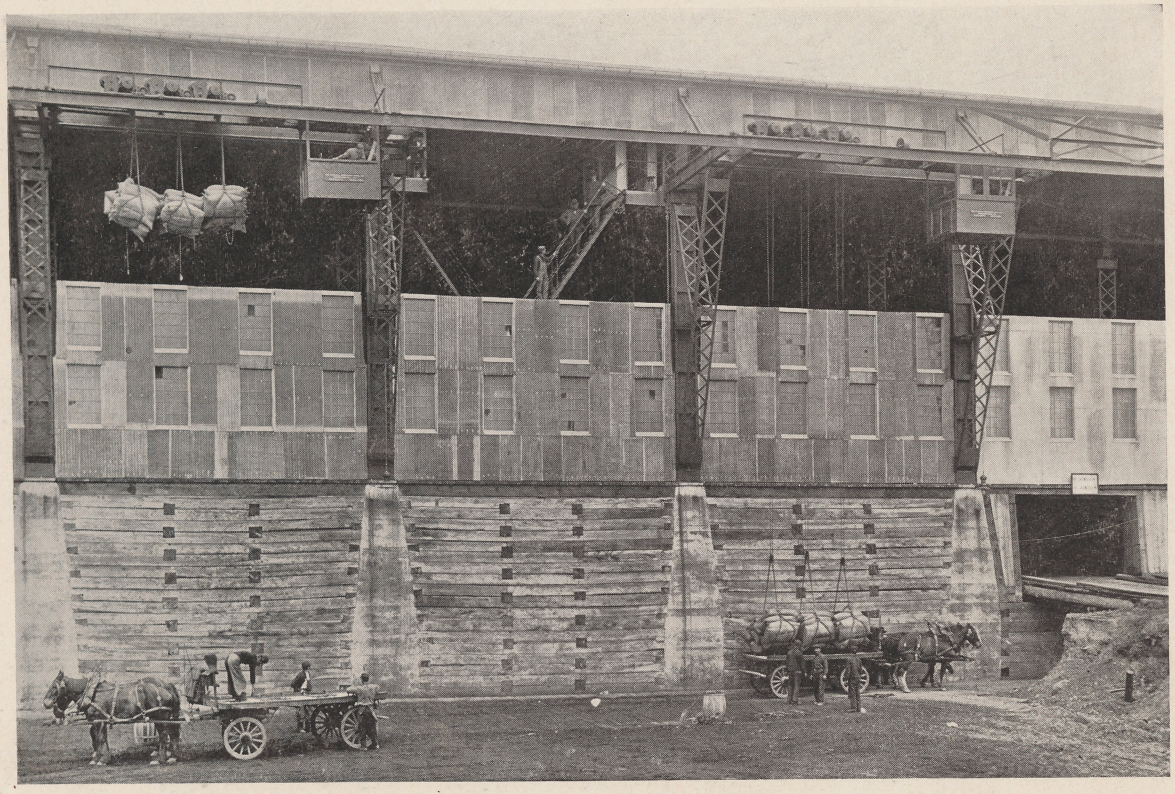
5-TON CRANE

Lift, 25 feet Span, 70 feet

IN SERVICE OVER STRUCTURAL STEEL YARD



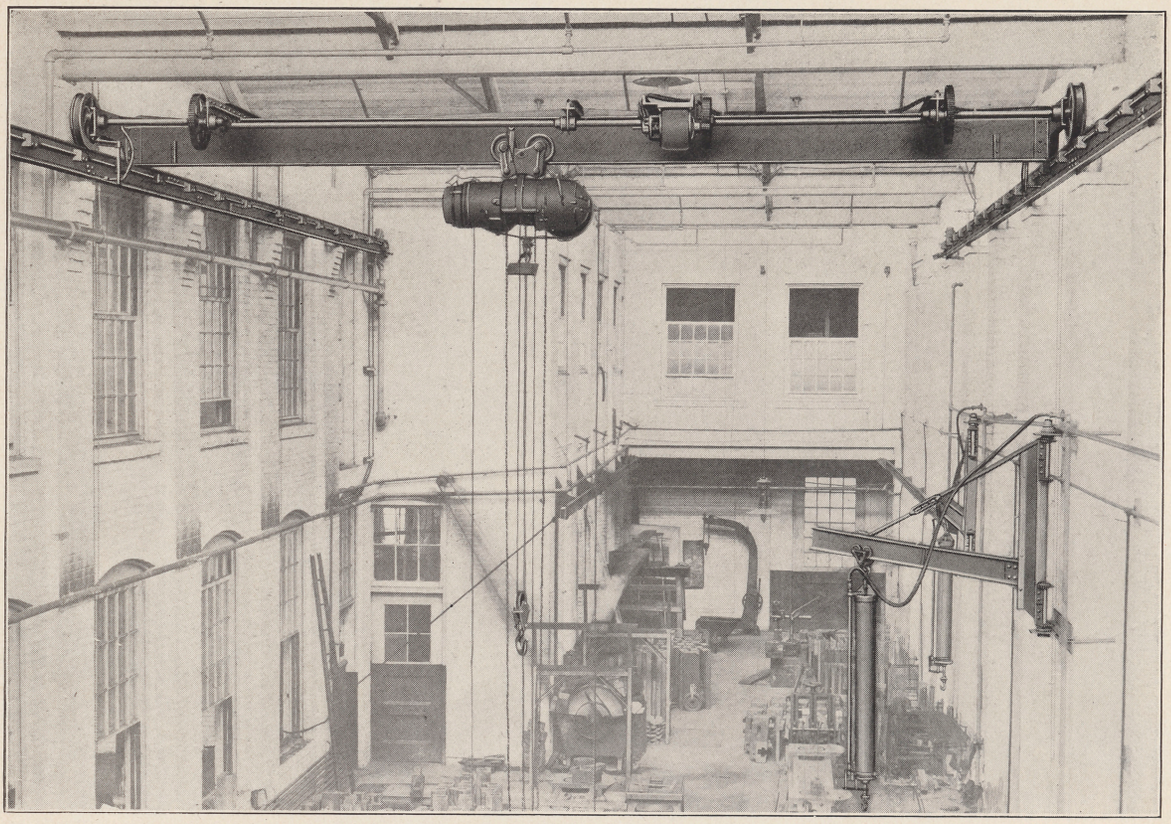
10-TON MOTOR-DRIVEN TRANSFER BRIDGE. Span, 115 feet
Having Two Cage Controlled Electric Traveling Hoists
IN SERVICE OVER STRUCTURAL STEEL YARD



THREE 7-MOTOR CRANES

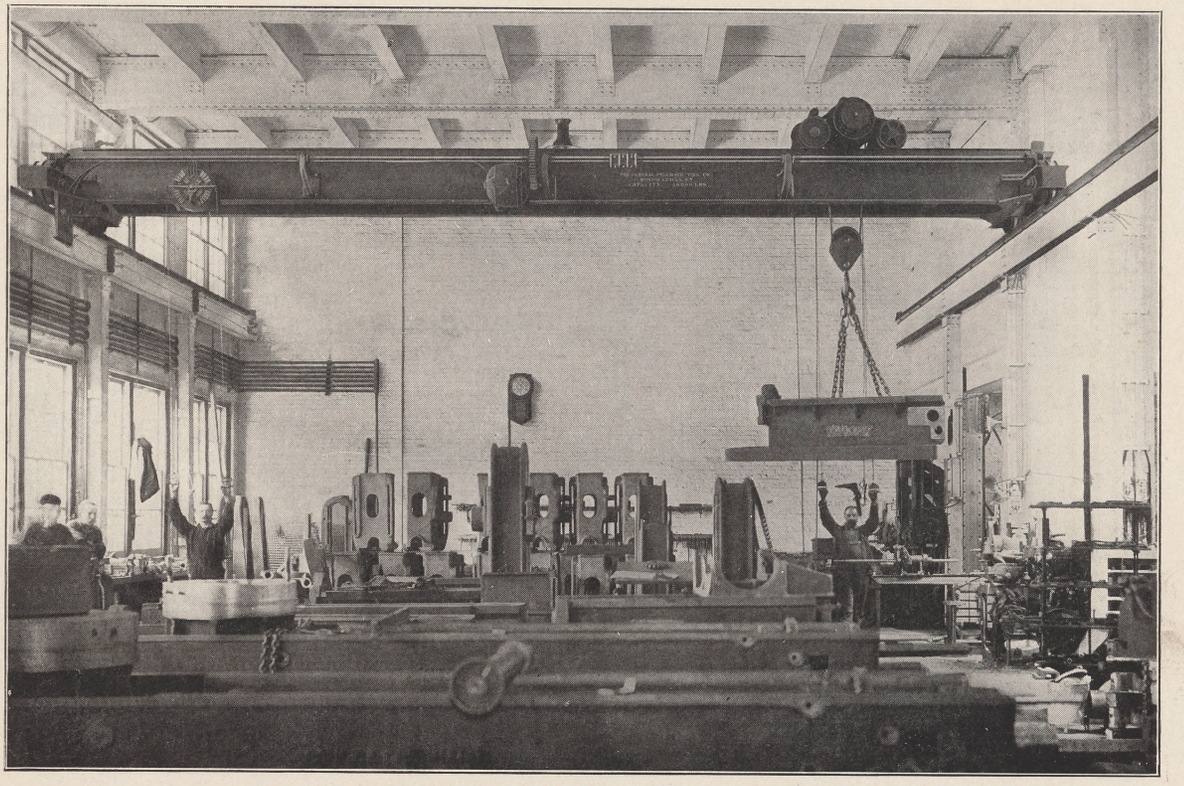
Lift, 50 feet Speed of lift, 100 feet per minute

IN SERVICE IN SUGAR REFINERY WAREHOUSE



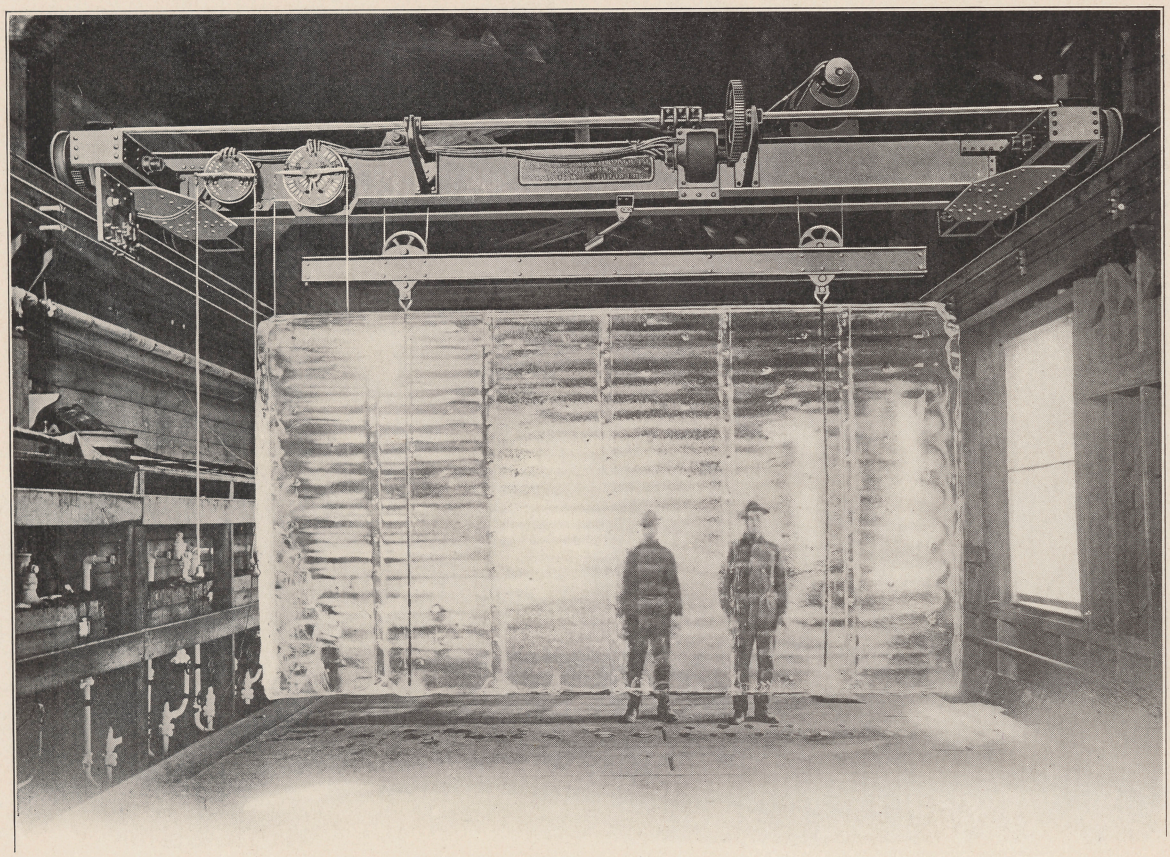
SINGLE-I TYPE THREE-MOTOR ELECTRIC TRAVELING CRANE

Capacity, 3 tons Span, 25 feet, 6 inches



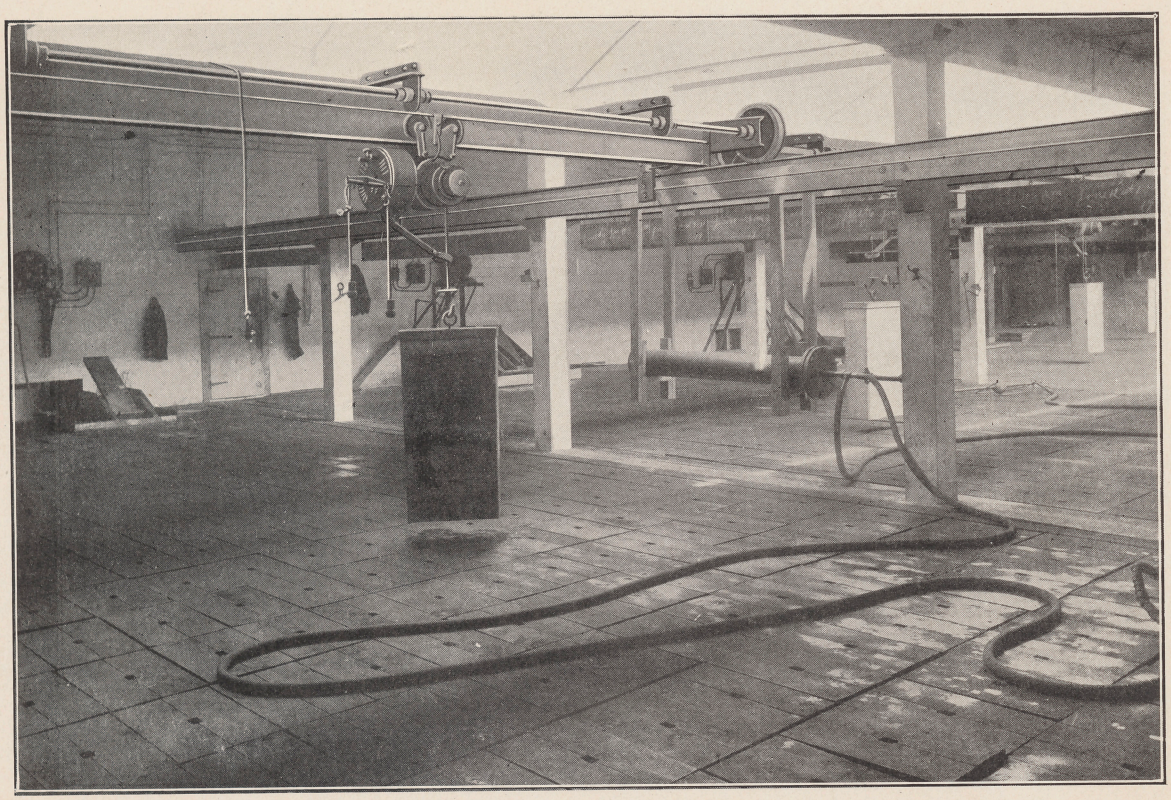
REGULAR TYPE TWO-MOTOR ELECTRIC TRAVELING CRANE

Capacity, 10 tons Span, 34 feet, 10¼ inches



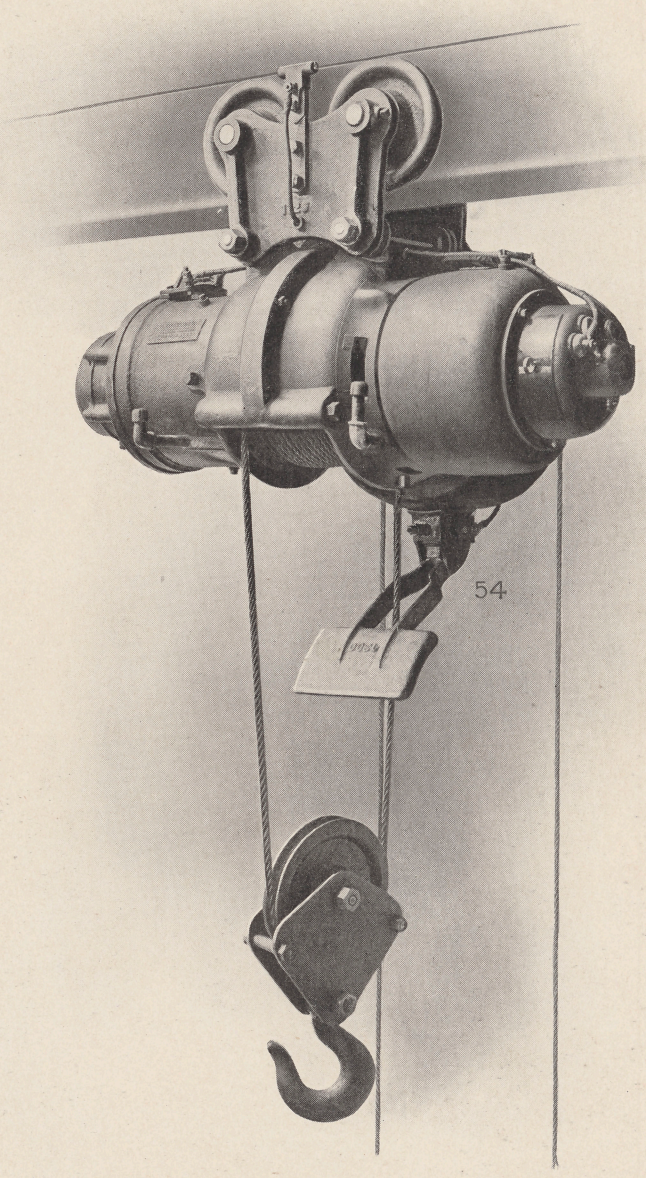
TWO-MOTOR PLATE ICE CRANE

Capacity, 5 tons Span, 23 feet, 9 inches

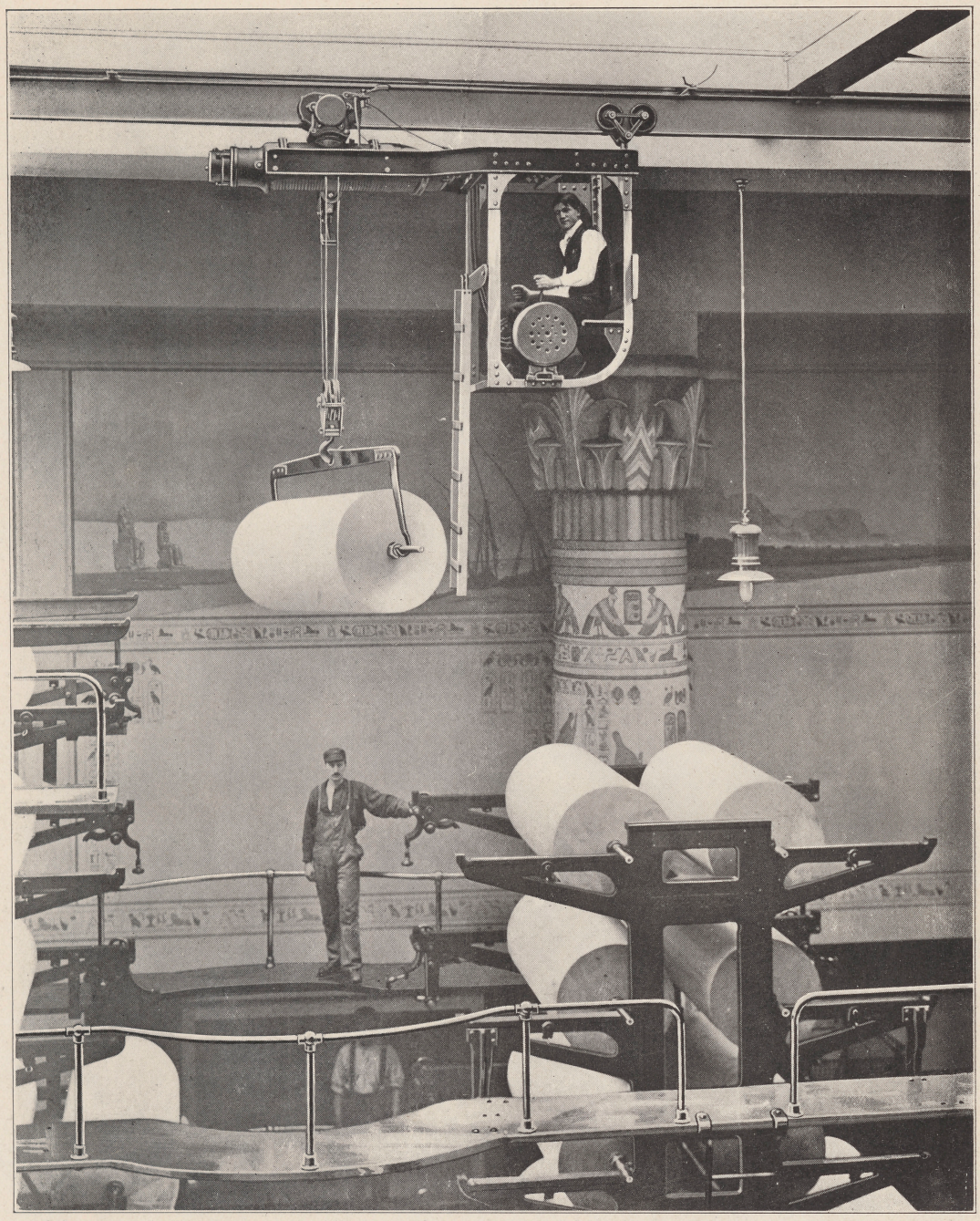


ONE-MOTOR CAN ICE CRANE

Capacity, ½ ton Span, 24 feet, 3 inches



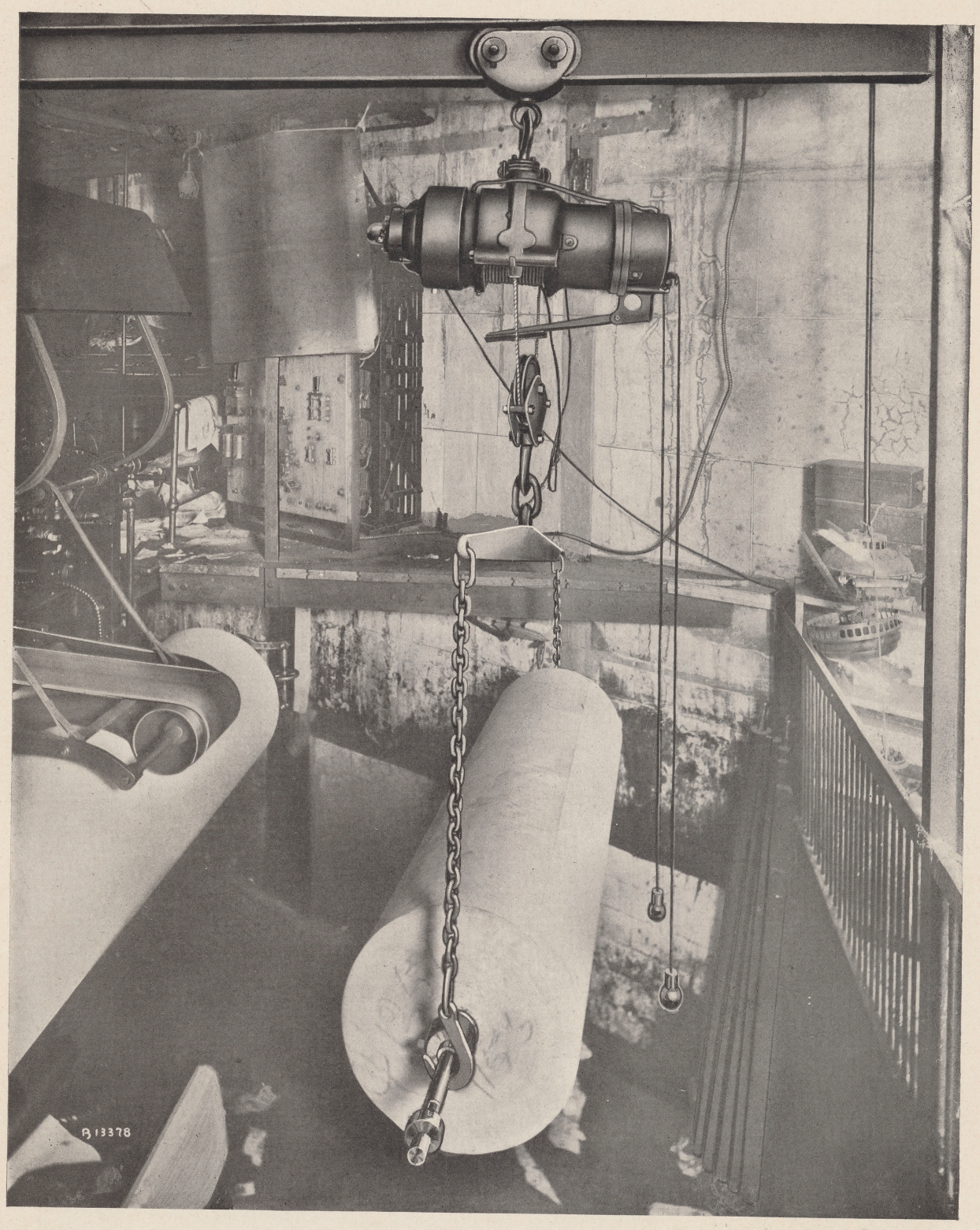
SINGLE I-BEAM ELECTRIC TRAVELING HOIST



CAGE CONTROLLED HOIST

Capacity, 2 tons Lift, 45 feet

IN SERVICE OVER PRINTING PRESS

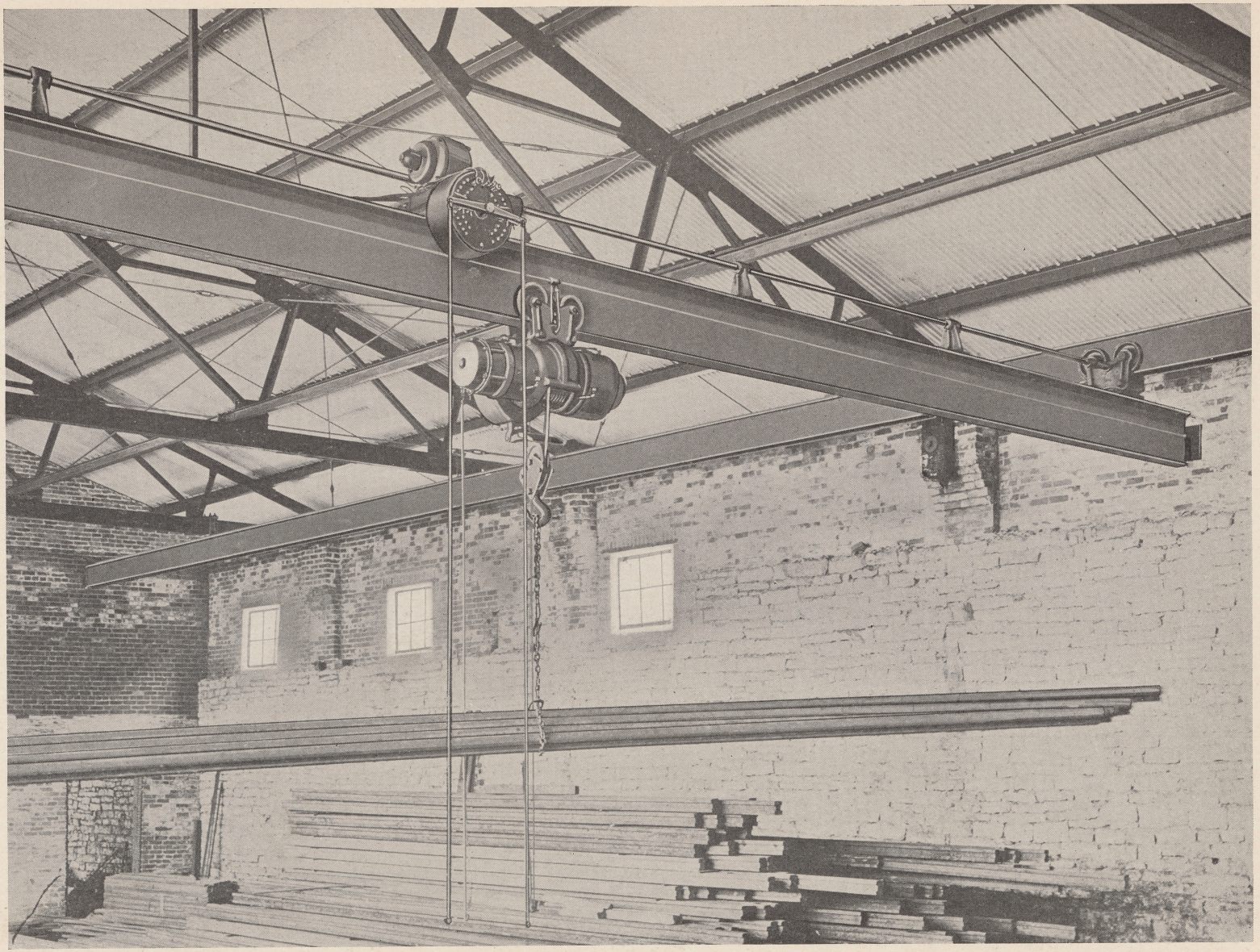


HOOK TYPE ELECTRIC HOIST

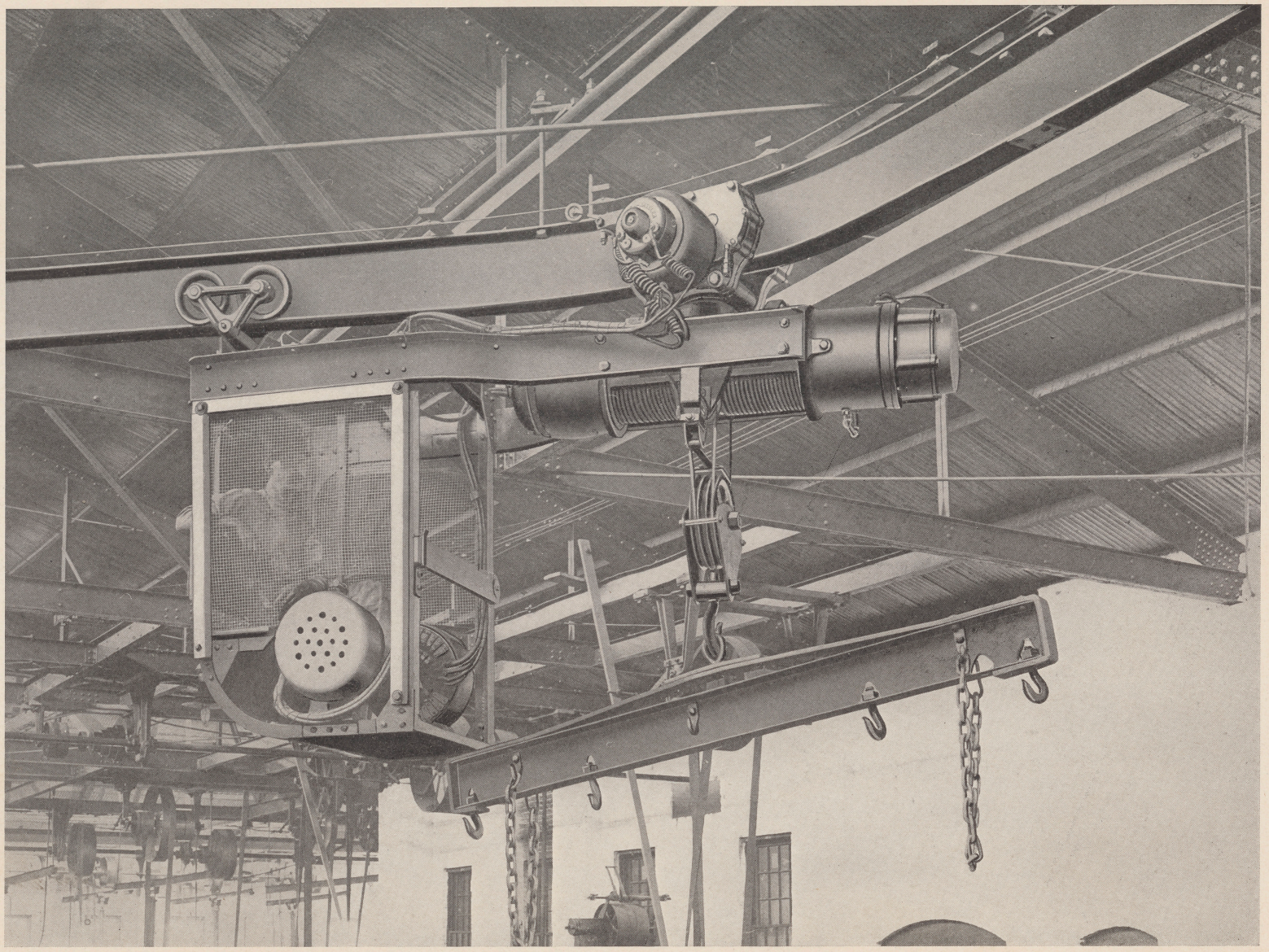
Capacity, 1 ton Lift, 20 feet

IN SERVICE OVER PRINTING PRESS

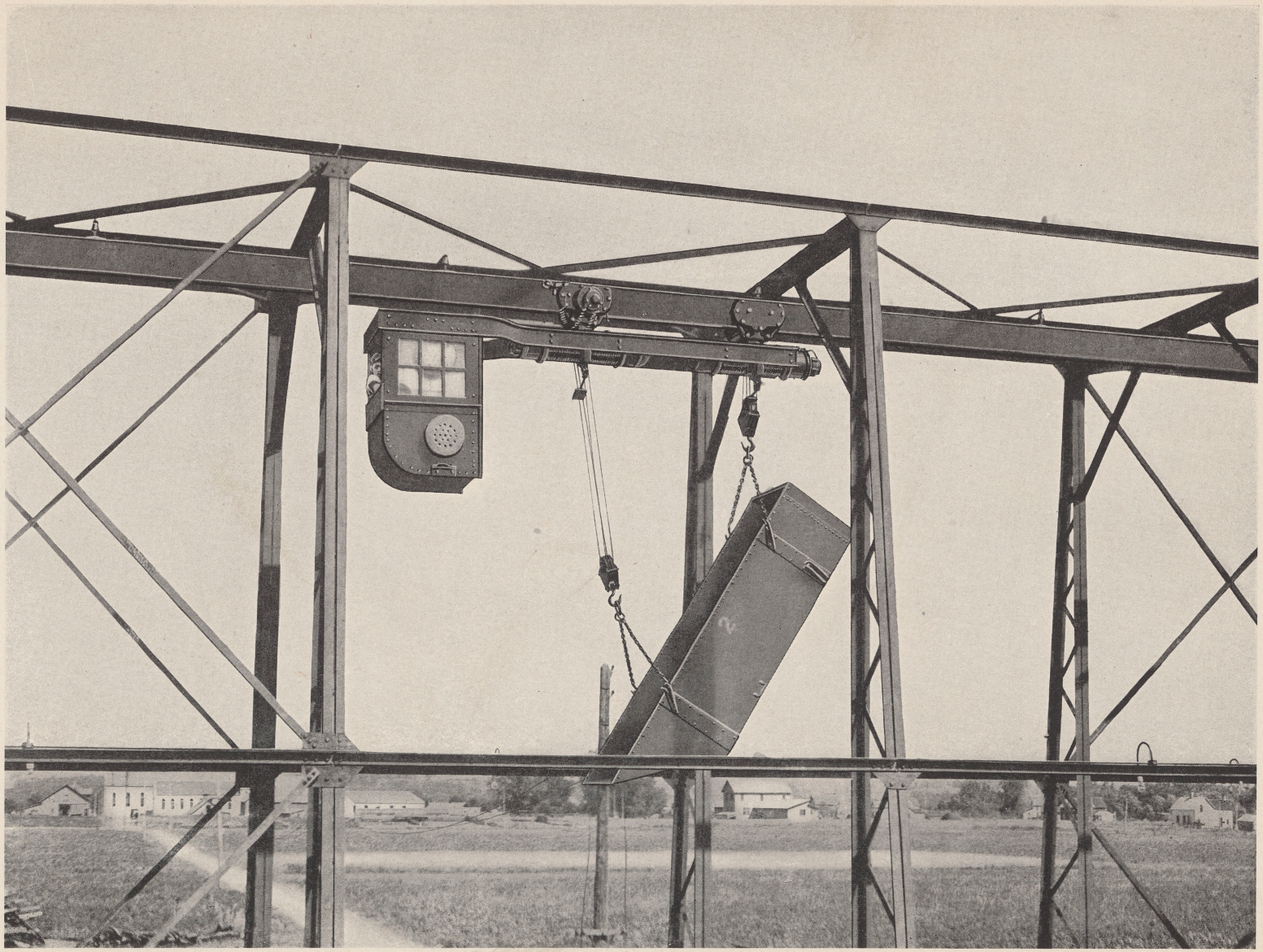
2-TON SINGLE I-BEAM ELECTRIC HOIST



2-TON SINGLE I-BEAM ELECTRIC HOIST AND CRANE



3-TON CAGE CONTROLLED ELECTRIC HOIST



TANDEM CAGE CONTROLLED ELECTRIC HOIST
IN SERVICE IN A GARBAGE DISPOSAL PLANT